

VIA EMAIL

March 14, 2011
Dr. Holly Stallworth,
Designated Federal Officer
EPA Science Advisory Board
(1400R), U.S. Environmental Protection
Agency, 1300 Pennsylvania Avenue,
NW., Washington, DC 20004

RE: Louisiana Chemical Assn. and Louisiana Mid-Continent Oil and Gas
Association Comments on Ozone NAAQS Reconsideration
File No.: 3645-212

Dear Members of the Committee:

Our firm is counsel to the Louisiana Chemical Association (“LCA”) and the Louisiana Mid-Continent Oil and Gas Association (collectively, the “Associations”). We are submitting comments for your consideration prior to the March 23, 2011 meeting of the Ozone Advisory Subcommittee concerning the charge questions submitted by EPA to the Clean Air Science Advisory Committee (“CASAC”) in the January 26, 2011 memorandum from the EPA Office of Air Quality Planning and Standards (OAQPS). The questions are related to the EPA’s pending “reconsideration” of the 2008 proposed National Ambient Air Quality Standard (NAAQS) for Ozone.

The Louisiana Chemical Association (“LCA”) is a nonprofit Louisiana corporation composed of 64 member companies with over 90 chemical manufacturing plant sites in Louisiana. LCA members employ over 24,000 persons in Louisiana, who not only work in the communities their companies call home – they live there, too. LCA members are committed to excellence in safety, health, security and environmental performance. LCA’s member companies operate in every region of the state and all have operations that will be affected by EPA’s proposed revisions to the ozone NAAQS.

The Louisiana Mid-Continent Oil & Gas Association (“LMOGA”) is an industry trade association representing individuals and companies who together produce, transport, refine and market crude oil, natural gas, petroleum products and electricity in Louisiana. The LMOGA consists of 15 refineries and numerous production facilities, natural gas plants, compressor stations, and product terminals throughout the state. The Louisiana oil and gas industry has a \$70

billion impact upon the state. Recent studies show that each petroleum industry job supports 4.5 additional jobs in the state. Further, the petroleum industry pays \$1.4 billion in state taxes and fees and more than \$4 billion in wages. Louisiana is the third leading producer of natural gas and the fourth leading producer of crude oil in the country. When including the oil and gas production in the Gulf of Mexico, Louisiana becomes the second leading natural gas producer in the country and the third leading crude oil producer. Currently, natural gas being produced from just one area of Louisiana, the Haynesville Shale, has been estimated to constitute between 5 and 10% of the entire nation's natural gas output.

The Associations submit the following comments that are relevant to the questions for which EPA requested CASAC input.

I. Strengths and Limitations of Evidence Concerning Asthma

A. Human Exposure Studies

The Associations believe that the strength of evidence of **human exposure studies** is weak in showing any impact on asthma when ozone concentrations are below 0.08 ppm. In support of this position, the Associations hereby adopt by reference the comments of J. Goodman, Gradient, on behalf of the American Petroleum Institute made to CASAC on February 18, 2011.¹

B. Epidemiological Studies

1. EPA Reliance Upon the Mortimer Study and Other Studies That Do Not Appropriately Address Confounding Factors Is Misplaced

The "new" *epidemiology* studies used by EPA for the review leading to the adoption of the 2008 standard do not support lowering the standard from the 75 ppb level. Epidemiology studies conducted since the last standard revision do not demonstrate a link between adverse health outcomes at ozone concentrations less than 0.08 ppm. In fact, although the studies show that ozone is a respiratory irritant, the more recent studies indicate that the risk of adverse health impacts is actually lower than believed in 1996/1997 when the prior 85 ppb 8-hour standard was adopted. The epidemiology studies cited by EPA in the review leading to the 2008 standard addressed a wide variety of potential health effects, from irritation to asthma to mortality.²

¹ See comments of Julie Goodman, Gradient Corp., sponsored by the American Petroleum Institute, at: [http://yosemite.epa.gov/sab/sabproduct.nsf/30812D837F4D04F7852578310050E455/\\$File/API+Comments+from+Julie+Goodman.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/30812D837F4D04F7852578310050E455/$File/API+Comments+from+Julie+Goodman.pdf).

² With regard to the mortality studies, the evidence does not in any way confirm that ozone exposure causes premature death. In fact, in some of these mortality studies, a positive correlation between ozone and premature deaths was noted in a number of urban areas. In other words, in some cities, higher ozone was associated with lower rates of premature death. It is biologically implausible for ozone to be associated with prevention of mortality in some cities while being associated with higher incidences of premature death in others.

EPA did not explain these inconsistent findings and weaknesses in the studies it used and in such failure, did not use sound science. In virtually all of the epidemiology studies involving various endpoints, the inconsistencies can be potentially explained by other factors, such as heat, cockroaches, mouse dander/droppings, mold, other pollutants, and other confounding factors being the likely culprit in the health effect at issue. EPA's review of these epidemiology studies failed to account for the confounding of outcomes by the presence of these other factors. Without addressing confounding factors, the studies cannot identify a cause-effect relationship between ozone and the health outcome, and the strength of any potential association is significantly diminished.

Most of the epidemiology studies used by EPA in this review were conducted for purposes other than evaluation of ozone causation. The main problem with such studies is that there are a number of confounding factors that can influence health outcomes in such studies. When imprecise exposure metrics and uncontrolled factors are involved, the best that can be said of such studies is they show the *possibility of associations* between ozone levels and health outcomes. However, without adequately addressing confounding factors, such as heat, particulate matter, socioeconomic status, and the like, such epidemiological studies should be given limited weight, particularly when the associations they suggest are biologically implausible.

All epidemiological studies are to a great degree suspect in the strength of such potential causal associations because the only studies that actually measured individual exposure to ozone demonstrated that there was no correlation between exposure and ambient monitoring data. Furthermore, it was found that indoor ozone levels were typically one half to only 10 % of the ambient outdoor levels. The Criteria Document (CD) for the 2008 primary standard acknowledged that there is no clear consensus among exposure analysts as to how well stationary monitor measurements of ambient ozone represent a surrogate for personal ozone exposure.³

It is particularly troubling that EPA placed so much emphasis on the Mortimer *et. al.*, 2001 study to show an association between ozone and asthma in children when the Mortimer study consisted of application of old air pollution data to a 1993 study of the effects of indoor allergens on inter-city children in nine major metropolitan areas. In 2001, Mortimer et al., used data collected from a 1993 study called the National Cooperative Inner-City Asthma Study ("NCICAS"). They compared the data to air pollution data from EPA's Aerometric Information Retrieval System ("AIRS")⁴ database for the same time period. The results of this study are stressed by EPA as establishing a link between ozone and asthma. However, EPA's reliance is

³ Criteria Document, Section 3.8, page 3-71.

⁴ The Aerometric Information Retrieval System (AIRS), a computer-based repository for information about air pollution in the United States. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. In AIRS, these sources are known as facilities, and the part of AIRS associated with data about sources is called the AIRS Facility Subsystem, or AFS. The information in AFS is used by the states to prepare State Implementation Plans, to track the compliance status of point sources with various regulatory programs, and to report air emissions estimates for pollutants regulated under the Clean Air Act. For the most part, such data is self-reported. The AIRS database does not revise prior reported data even when sources and states revise their emission inventories based on updated emission factors and estimates. Thus, the value of AIRS data in the 1993 time period should have been reassessed based on improved emission factors.

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Page 4

very troublesome given the age and purpose of the original study. The health effects data for this study was collected during the NCICAS in 1993.⁵ **This study was designed to investigate the effects of cockroach allergen on asthma in inner city children, not the impact of ozone.**⁶ The effects of dust mites and cat allergen were also studied. Effects of air pollution, including ozone, were not addressed at all.⁷

The study was successful in that a positive correlation between asthma and cockroach allergen was found. Children who were both allergic to cockroaches and exposed to cockroach allergen were hospitalized for their asthma 3.3 times more often than the other children in the study. Those children also missed school more often, needed nearly twice as many unscheduled asthma-related medical visits, and suffered through more nights with lost sleep.

To be eligible for the study, the children had to reside in a neighborhood where at least 30% of the families were below the 1990 poverty level. Some reports state that all subjects were

⁵ <http://www.erj.ersjournals.com/cgi/content/full/19/4/699>.

⁶ A number of studies have found that levels of cockroach allergen in homes are one of the strongest risk factors predictive of allergic sensitization and asthma morbidity in children (Arruda et al. 2001; Call et al. 1992; Chapman et al. 1996; Crain et al. 2002; Eggleston et al. 1998; Gelber et al. 1993; Rosenstreich et al. 1997; Sarpong et al. 1997). Richard D. Cohn; Samuel J. Arbes Jr.; Renee Jaramillo; Laura H. Reid; Darryl C. Zeldin, "National Prevalence and Exposure Risk for Cockroach Allergen in U.S. Households," Environmental Health Perspectives, April 27, 2006.

⁷ An abstract of the NCICAS describes the study as follows:

BACKGROUND: Cockroach allergen is important in asthma. Practical methods to reduce exposure are needed. **OBJECTIVE:** We sought to evaluate the effectiveness of house cleaning and professional extermination on lowering cockroach antigen levels in inner-city dwellings. **METHODS:** As part of the National Cooperative Inner-City Asthma Study intervention, 265 of 331 families with asthmatic children who had positive skin test responses to cockroach allergen consented to a professional home extermination with 2 applications of a cockroach insecticide (Abamectin, Avert) combined with directed education on cockroach allergen removal. On a random subset of 48 homes undergoing cockroach extermination in the intervention group, Bla g 1 was measured in settled dust from the kitchen, bedroom, and TV/living room. The first sample was collected 1 week before extermination, with additional samples after the exterminations at approximately 2, 6, and 12 months after the first sample. Self-reported problems with cockroaches were collected at baseline and after 12 months of follow-up in both the intervention and control group. **RESULTS:** The geometric mean kitchen level of Bla g 1 decreased at 2 months (33.6 U/g) relative to preextermination levels (68.7 U/g, $P < .05$). The percent of kitchens with over 8 U/g of Bla g 1 followed a similar pattern, but only the decrease from preextermination to 6-month levels was significant (86.8% vs 64.3%, $P < .05$). By the 12-month visit, the allergen burden had returned to or exceeded baseline levels. Except for an increase in the bedroom at 2 months (8.9 U/g vs 11.1 U/g, $P < .05$), no other significant change was seen. Only about 50% of the families followed the cleaning instructions; no greater effect was found in these homes. Self-reported problems with cockroaches showed no difference between the intervention and control group after 1 year of follow-up. **CONCLUSIONS:** Despite a significant, but short-lived, decrease the cockroach allergen burden remained well above levels previously found to be clinically significant.

See:

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Page 5

from families below the poverty level.⁸ The children ranged from 4 to 9 years of age. 58% resided in households with at least one smoker.⁹

The data on lung function measurements were measured by a self-administered test. This data and any observed symptoms were recorded in a written diary which was subsequently submitted to the researchers. Each diary covered only 2 weeks.

In 2001, Mortimer retroactively used the data from the NCICAS collected from June through August 1993 (typically only one diary per child), and air pollution data from EPA's AIRS database for that same period. *In a completely unscientific manner, when more than one monitor was located in the child's county of residence, the readings from all monitors were averaged together, regardless of the location of the monitors or the child's residence.*¹⁰

The strongest correlation found by Mortimer was using *a 5 day rolling average* of the ambient ozone data. If one is to accept this, then using only 2 weeks of response data appears inadequate.¹¹ Furthermore, there is no plausible biological explanation for an effect with this averaging period. There are no studies indicating that an exposure to ozone produces symptoms 5 days after a peak exposure. The primary ozone standard is an extreme value standard based on only 8 hours of exposure, which does not correlate at all with the Mortimer review.

EPA's overly strong reliance on this study is gravely misplaced. The study involved a great number of potential confounders. The Mortimer study, which involved 8 cities, had EPA AIRS data for only one of the criteria pollutants --SO₂, for all 8 cities. The AIRS database did not have data for all of the other criteria pollutants for each study. When SO₂ and ozone were included in a two-pollutant model, the impact of ozone became non-significant.¹² When multi-pollutant models were used to evaluate SO₂, NO_x and ozone, the ozone was also not significant. In the three cities where PM₁₀ data was available, ozone was not significant. Only SO₂ remained significant in the seven cities that had all 3 pollutants (SO₂, ozone and PM) measured.¹³

⁸ The authors of the study indicate that all of the children resided in major metropolitan inner-city areas . The eight metropolitan areas studied were: Baltimore, Washington D.C., the Bronx in New York, East Harlem in New York, St. Louis, Chicago, Cleveland and Detroit..

⁹ See NCICAS study available at:

http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=10069886&dopt=AbstractPlus

¹⁰ This requires that a great deal of skepticism be applied to any conclusions drawn from Mortimer's review. For example, in the Baton Rouge area, there are 5 parishes (equivalent to a county in other states), encompassing over 2,185 square miles. (U.S. Census Bureau, State and County Quick Facts) There are 10 ozone monitors in the area.

¹¹ See Comments of Jay Turim, Exponent, Inc., sponsored by the American Petroleum Institute, February 18, 2011 at

[http://yosemite.epa.gov/sab/sabproduct.nsf/4C95FE7BF89ECF7D852578340063D301/\\$File/API+comments+from+Jay+Turim,+Exponent,+Inc..pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/4C95FE7BF89ECF7D852578340063D301/$File/API+comments+from+Jay+Turim,+Exponent,+Inc..pdf). See also The Annapolis Center for Science-Based Public Policy, "The Science and Health Effects of Ground-Level Ozone," (hereinafter, the Annapolis Study), pages 38-39.

¹² *Id.*

¹³ *Id.*

In a study by Gergen PJ, Mitchell H, and Lynn H, in 2002,¹⁴ the researchers reviewed the seasonal patterns of asthma symptoms and health services used to determine the impact of allergen sensitivity, exposure to environmental tobacco smoke (ETS), and air pollution on such seasonal patterns. Participants in the NCICAS were tracked for approximately four years after allergen skin testing and determination of exposure to environmental tobacco smoke. The authors also obtained air pollution data from EPA monitoring sites in the NCICAS cities. *The authors found that asthma symptoms (wheeze) and health care services usage (unscheduled visits and hospitalization) had similar seasonal patterns, with low points during the summer months of June through August and a distinct autumn peak beginning in September.*¹⁵ They found that the seasonal patterns were similar among children with no allergen skin test reactivity, those reactive only to indoor allergens, and those reactive to outdoor allergens. They also found that ETS exposure was not related to the observed seasonal asthma patterns. There was also no correlation of air pollutant exposure to the asthma morbidity, with the exception that the seasonal pattern of SO₂ coincided with that of asthma morbidity. The authors concluded that “most air pollutants do not appear to contribute to the distinct asthma seasonal pattern.” *Equally important is the finding that the three main symptoms of asthma related illness (wheeze, unscheduled medical visits, and hospitalizations) reached their lowest levels in the summer months of June through August, the primary months when higher ozone levels are typically seen.*

2. The Schildcrout Study Shows No Association Between Ozone and Asthma

In another recent 2006 study, apparently not reviewed by EPA as part of the development of the 2008 standard or the reconsideration, was conducted by Schildcrout.¹⁶ In that study, *no association was found between ozone concentrations and exacerbation of asthma.*

LCA and LMOGA request that CASAC advise EPA to consider the Gergen and Schildcrout studies and then to revise its conclusions concerning the affect of ozone on asthma-based upon such review. EPA has a duty to do so per Section 108 of the Clean Air Act.

3. 2006 Louisiana Department of Health and Hospitals Study Finds No Association Between Asthma Related Hospital/Medical Clinic Visits and Ozone

A more recent study, not reviewed by EPA as part of the development of the 2008 standard, shows no correlation between ozone levels and children’s hospital visits. In 2006, EPA funded a study conducted by the Louisiana Department of Health and Hospitals (“LDHH”) on

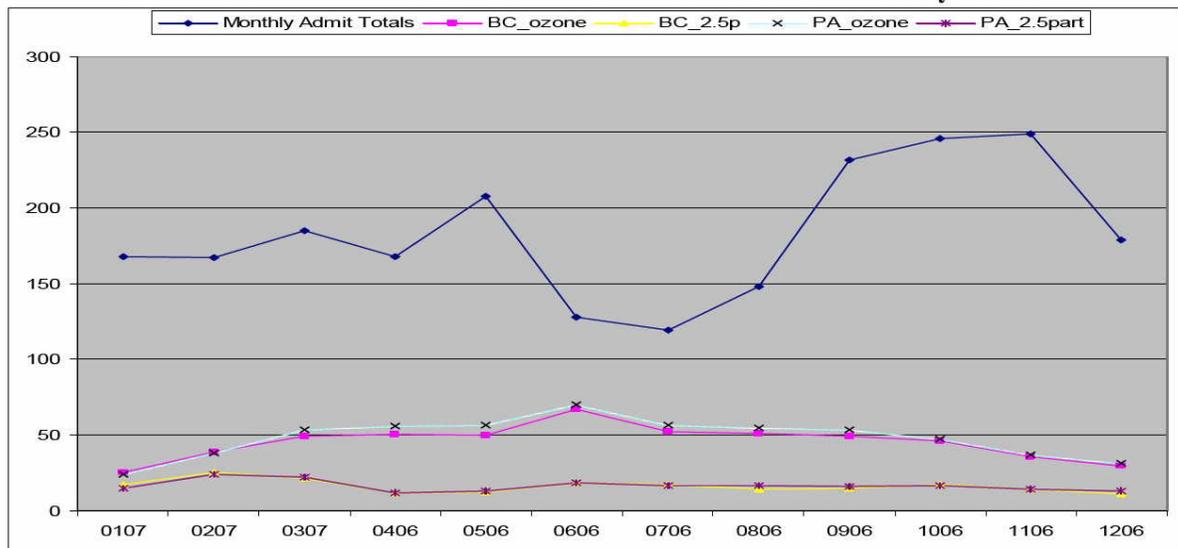
¹⁴ Gergen P.J., Mitchell H, and Lynn H, “Understanding the Seasonal Pattern of Childhood Asthma: Results from the National Cooperative Inner-City Asthma Study (NCICAS,” November 2002 *Journal of Pediatrics* 141, pp. 631-636. The authors conducted the study for the Agency for Healthcare Research and Quality, Rockville, Md.

¹⁵ As will be discussed below, the exact same pattern was found in a more recent EPA funded study in Louisiana.

¹⁶ J.Schildcrout, L. Sheppard, T. Lumley, J. Slaughter, J. Koenig, G. Shapiro “Ambient Air Pollution and Asthma Exacerbations in Children: An eight-city analysis. *Am. J. Epidemiology*, advance access published June 23, 2006. Cited in Annapolis Study, page 39.

asthma in children in Louisiana. The LDHH conducted a study concerning whether hospital and medical clinic visits for asthma were correlated with ozone levels in East Baton Rouge and Pointe Coupee Parishes. A copy of the summary report for that study is attached as Exhibit 1. The LDHH study looked at asthma emergency room visits by children in both parishes for a 1 year period and compared the data to ozone and fine particulate matter monitoring data supplied by certified monitors from the Louisiana Department of Environmental Quality (“LDEQ”). Ozone levels monitored at the ambient monitoring locations exceeded 60 ppb on a number of days. The conclusion of that study was that **“there was no direct correlation between ozone readings measured and problems associated with asthma.”**¹⁷ This conclusion is illustrated by Table 5.0 of the report.

Table 5.0: EBR Asthma Related ED Admits and Environmental Indicators by Month



As was the case with the Gergen study discussed above, the LDHH study shows that asthma health care services usage had similar seasonal patterns, with low points during the summer months of June through August and a distinct autumn peak beginning in September.

4. Louisiana and Center for Disease Control (“CDC”) Data Show that Areas Where Ozone is Lowest Have Higher Rates of Asthma

Louisiana’s asthma prevalence rate is below the national average. According to the Louisiana Department of Health and Hospitals (“LDHH”), there was a decreasing trend for the in the prevalence of asthma diagnosis from years 2004 to 2007 (the last year for which statistics have been compiled), and the prevalence of asthma diagnosis for Louisiana residents was lower than the national average from the year 2000 to 2007.¹⁸ CDC data also confirm that Louisiana

¹⁷ See Table 5.0: EBR Asthma Related ED Admits and Environmental Indicators by Month, “Louisiana’s Report on Establishing a Childhood Asthma, Surveillance System, Summary Report,” (LDHH 2008, emphasis added).

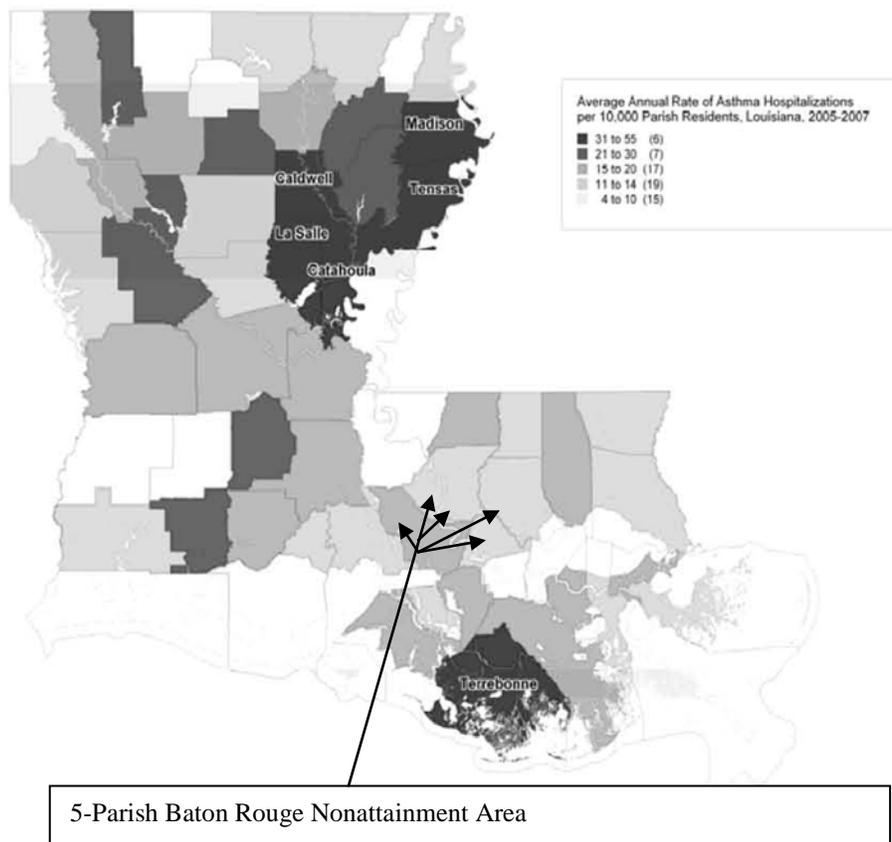
¹⁸ “2007 Asthma Surveillance Report,” Louisiana Department of Health and Hospitals, <http://www.dhh.louisiana.gov/offices/miscdocs/docs-287/Asthma%20Burden%20Report.pdf>.

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asthma prevalence rates are well below national averages, with Louisiana ranking among the top 3 states for low asthma rates.¹⁹

What is more important, however, is that LDHH data also demonstrate that parishes²⁰ with higher asthma prevalence rates are not those with higher ozone design values. As noted in the figure below, the highest asthma hospitalization rates appear to occur in the more rural parishes in the Mississippi Delta Region (Madison, Tensas, Claiborne, LaSalle, and Caldwell), not in the 5-parish Baton Rouge Area (Ascension, East Baton Rouge, Iberville, Livingston and West Baton Rouge) that was in nonattainment with the 8-hour ozone NAAQS during part of these years (2005 and 2007).²¹

Figure 7. Average Annual Rates of Asthma Hospitalizations / 10,000 residents by parish, Louisiana 2005-2007



¹⁹ See Center for Disease Control, “2009 Adult Asthma Data” available at <http://www.cdc.gov/asthma/brfss/09/lifetime/tableL1.htm> (last viewed 3/14/11).

²⁰ A parish is a governmental unit in Louisiana equivalent to a county in other states.

²¹ *Id.* Compare this map with the maps of potential nonattainment areas under the EPA Regulatory Impact Analysis (RIA) for the 2008 rulemaking and the Supplement to the RIA and it becomes clear there is little overlap.

The CDC data on asthma prevalence for the United States as a whole do not show a link between asthma and ozone levels. Several states with very low ozone values (see map at Page 11 of these comments) are among those with high asthma prevalence (Oregon, Washington and Maine).²²

5. Although Ozone Levels Have Declined Dramatically Over the Last Decade, Asthma Prevalence Rates Have Increased

If there were a strong link between ozone exposures and asthma, one would logically expect that as ozone rates decrease, asthma prevalence rates as well as current asthma attack rates would likewise decrease. Instead, the opposite is occurring. It is without question that ozone levels have been dropping dramatically throughout the nation over the past decade. See the comparison of 1997-1999 ozone design values to the 2007-2009 ozone design values attached as Exhibit 2.

However, in the most recent annual report from the Center for Disease Control, “Asthma Prevalence, Health Care Use and Mortality, United States, 2005-2009,” (January 2011), it is clear that asthma prevalence rates have steadily climbed over the last decade and current asthma attack rates have stayed consistent, with no evidence of dropping as ozone levels dropped.²³ While such comparisons do not rise to the level of an epidemiological study, they provide reason for concern with any epidemiological studies that do not rule out confounding factors.

The draft CASAC response to EPA indicates that a study by Friedman in 2001 indicates that “when traffic density was decreased during the Summer Olympic Games in Atlanta in 1996, there was significantly decreased use of pediatric care for asthma that correlated best with a reduction in peak ozone concentrations (Friedman et al., 2001).” Further, the CASAC draft response indicates that “in this study, the relative risk of asthma events increased stepwise at cumulative ozone concentrations 0.060 to 0.089 ppm and 0.090 ppm or more compared with ozone concentrations of less than 0.060 ppm.” However, such study was very limited in scope and did not at all rule out other confounding factors associated with vehicle emissions, heat, or the like.

Elsewhere, the draft CASAC response acknowledges that “it is difficult to tease out the effects of a single 30 pollutant in epidemiological studies.” The Associations do not believe that the totality of the evidence supports a strong connection between ozone concentrations below 80 ppb and asthma effects. The EPA’s establishment of a 75 ppb standard in 2008 already provides for a margin of safety. The Associations believe that EPA should focus further research on some of the confounding factors considered in these various epidemiology studies, such as heat, mold, pollen, other pollutants and the like which have stronger associations with asthma and other health endpoints than does ozone. None of the epidemiology studies demonstrate a strong association between ozone and these health endpoints when such confounding factors are present. Given such weak associations and uncertainty, CASAC should urge EPA to conduct further research before determining it necessary to lower the ozone standard to protect public health.

²² For asthma prevalence rates by state, see CDC 2008 report: <http://www.cdc.gov/Features/dsAsthma/> Compare to ozone values shown on map on Page 11 of these comments.

²³ See <http://www.cdc.gov/nchs/data/nhsr/nhsr032.pdf> (last visited March 14, 2011).

II. CASAC Should Inform EPA That It Is Using an Inappropriate Level for “Policy Relevant Background”

EPA made at least two serious errors in reaching its conclusion that Policy Relevant Background (“PRB”) is only in the range of 15-35 ppb. First EPA excluded Canadian and Mexican pollution (as well as other foreign pollution) from being included in the background level on the theory that “the U.S. government has influence over emissions ... entering the U.S. from Canada and Mexico.”²⁴ Ozone from foreign sources that are not presently controlled by EPA must not be excluded from background. Such foreign sources are presently contributing potentially significant levels of ozone to the United States. Second, EPA should not have relied upon **modeled ozone levels**, but instead should use **actual monitored ozone levels** to establish background. The GEOS-CHEM model that EPA used is not yet sufficiently predictive of natural ozone events or foreign caused ozone events. Thus, CASAC should urge EPA to reestablish PRB using monitored data and then reanalyze whether such revised PRB supports a different level for the primary ozone NAAQS.

A. EPA Must Include in “Policy Relevant Background” the Ozone Contributions from Foreign Sources and Natural Sources

EPA supports the exclusion of Canadian and Mexican generated ozone on the theory that the United States has some “influence” over these countries and their generation of ozone precursors. However, EPA has not cited any statutory authority that EPA or any other federal agency has over the control of any such emissions. “Influence” is insufficient. If EPA does not have the legal ability to control such emissions, it must include them in policy relevant background. To do otherwise would artificially lower the ozone background level, which would in turn distort EPA’s assessment of risks to public health and welfare associated with control of domestic emissions. Due to this distortion, it is impossible to determine whether the proposed levels of the primary ozone NAAQS are actually capable of being attained through CAA regulatory measures. EPA cannot lawfully issue a new primary ozone standard until it appropriately includes Canadian and Mexican generated ozone, as well as that from other foreign sources in its analysis.

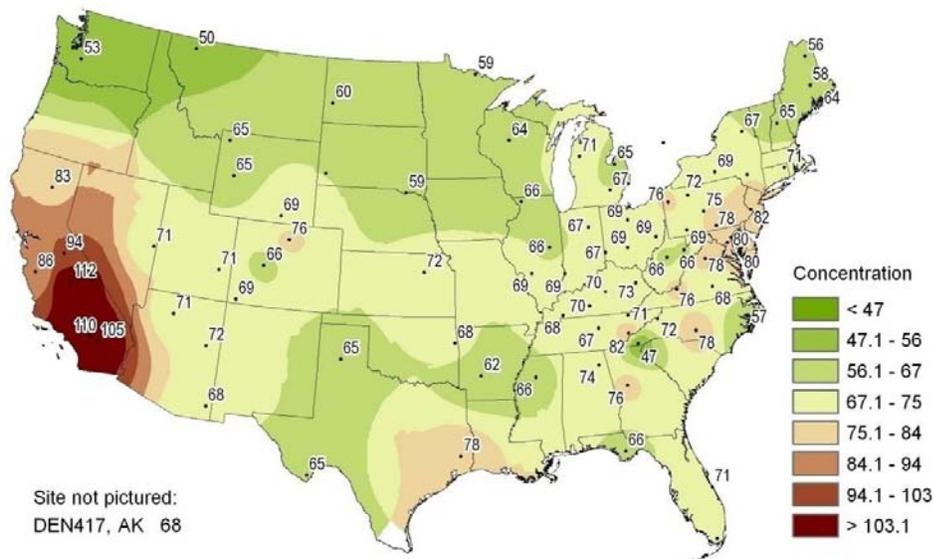
A number of studies have indicated that ozone conditions, particularly in the western United States, are influenced by international transport and by large natural events. Schwarzhoff, 2003, reviewed studies demonstrating that ozone precursors generated in Asia significantly impact the background levels of ozone measured in Western North America. Further, in the past two decades, it is well known that Eastern Asia has seen increasing energy consumption associated with fossil fuel combustion with the resulting NO_x and hydrocarbon emissions. Together with the lack of pollution control requirements in East Asia, this significant rise in energy consumption has led to increased pollution and international transport levels. Studies by Akimoto and Narita (1994) and Streets et al. (2001) found that during the past two

²⁴ See 73 Fed. Reg. 16,436, 16,468 (Mar. 27, 2008).

decades, NO_x emissions in Asia have increased at a rate of 4 to 6 percent per year. Ozone concentrations in these countries also had a steady increase of 2.5 percent per year from 1989 to 1997 (Lee et al., 1998).

A review of EPA's Clean Air Status and Trends Network (CASTNET), which measures rural and regionally representative concentrations of ozone to evaluate the effectiveness of state and regional control programs, shows that many parts of the country have ozone at the levels of the proposed reconsideration standard. Data from CASNET's 2008 Annual Report²⁵ show that much of the country, even predominantly rural areas, will be found to be in nonattainment of an ozone standard that falls within EPA's proposed range of 60 to 70 ppb.

Figure 4-3 Fourth Highest Daily Maximum 8-Hour Average Ozone Concentrations (ppb) for 2008



²⁵ Released February, 2010.

Several studies have indicated that wind conditions are conducive to long-range transport of ozone from Asia between April and June (Jacob et al., 1999). “Asian outflow to the Pacific is particularly strong in spring because of frequent cyclonic activity and associated warm conveyor belts (WCBs) that sweep across East Asia and lift pollution to the free troposphere and into the westerlies” (Stohl, 2001; Liu et al., 2003; Miyazaki et al., 2003). These winds carry the ozone precursors, ozone itself, and other pollutants from Asian countries to the Western United States, thereby resulting in increased background levels of ozone. Observations from aircraft used by the Photochemical Ozone Budget of the Eastern North Pacific Atmosphere (PHOBEA) measured pollution plumes as large as 27 ppbv over the United States West Coast that originated from Asia (Jaffe et al., 2002; Price et al., 2004).

In addition, United States National Park Service (NPS) data from six monitoring stations along the West Coast show “a constant, statistically significant, positive trend in background O₃” from April through August. (Jaffe et al., 2004) These six sites, located at Lassen Volcanic National Park, Point Reyes National Park, Redwood National Park, Cheeka Peak, WA; Point Arena, CA; and Trinidad Head, CA, were selected based upon the determination that they were free of significant influences from local emissions. The ozone concentrations ranged between ~30 and ~50 ppbv. This data from the Lassen site is graphically presented on the following table:

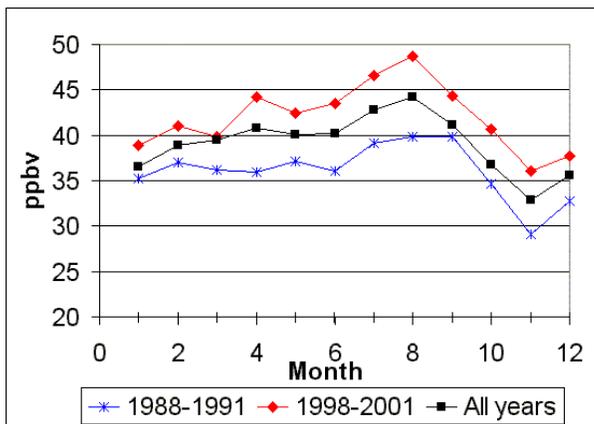


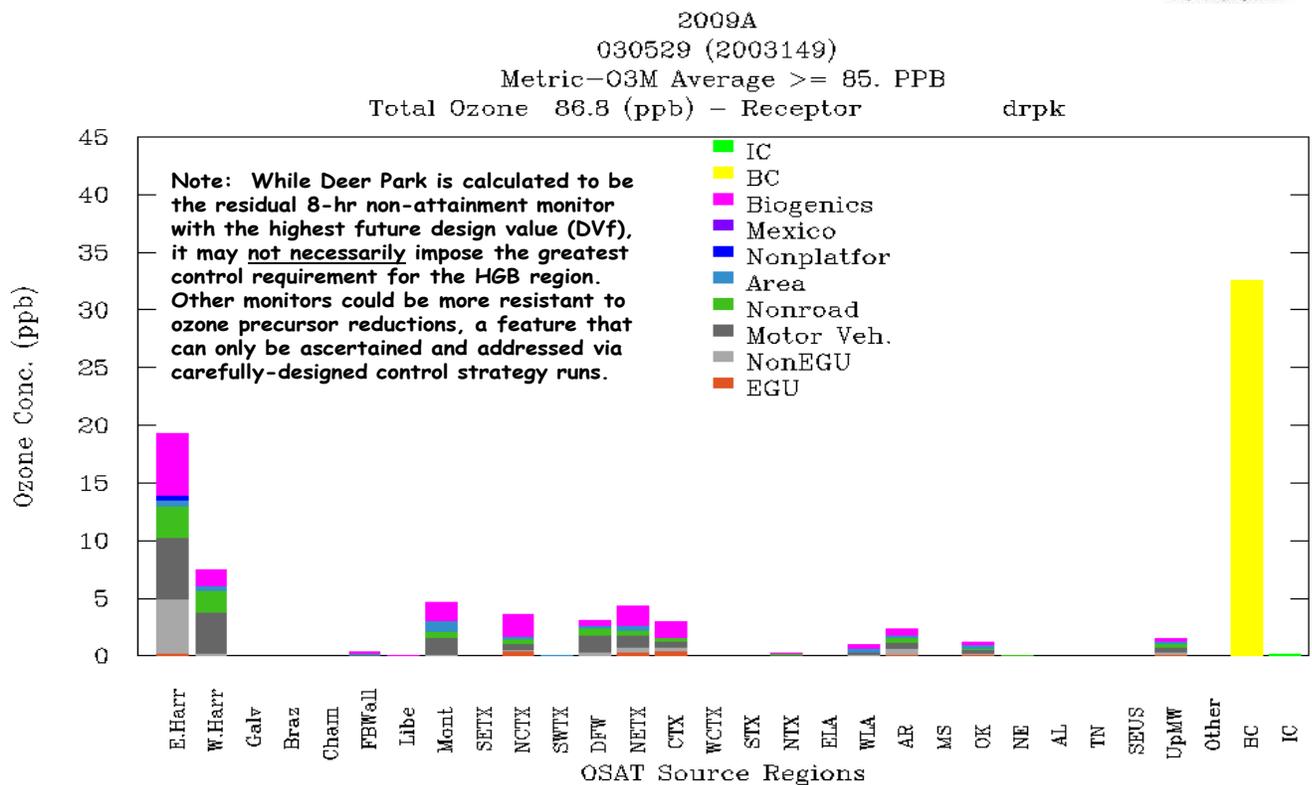
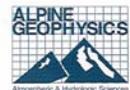
Figure 4- Ozone observations 1988-2001 from N.P.S. site at Lassen N.P. (Analysis by Dan Jaffe, University of Washington, Bothell)

The increasing trends of ozone concentrations in Asia that have been associated with increases of background ozone and NO_x levels in the Western United States are likely to lead to elevated ozone concentrations in excess of the NAAQS at the levels proposed by EPA.

In addition, recent air quality modeling of specific regions in the United States support a theory that boundary ozone levels play a much greater factor than anthropogenic levels that are susceptible of state and local controls. As noted in the comments on the proposed ozone reconsideration by several entities with members within the Houston area, detailed source apportioning modeling was conducted by Alpine Geophysics on the Houston Galveston non-

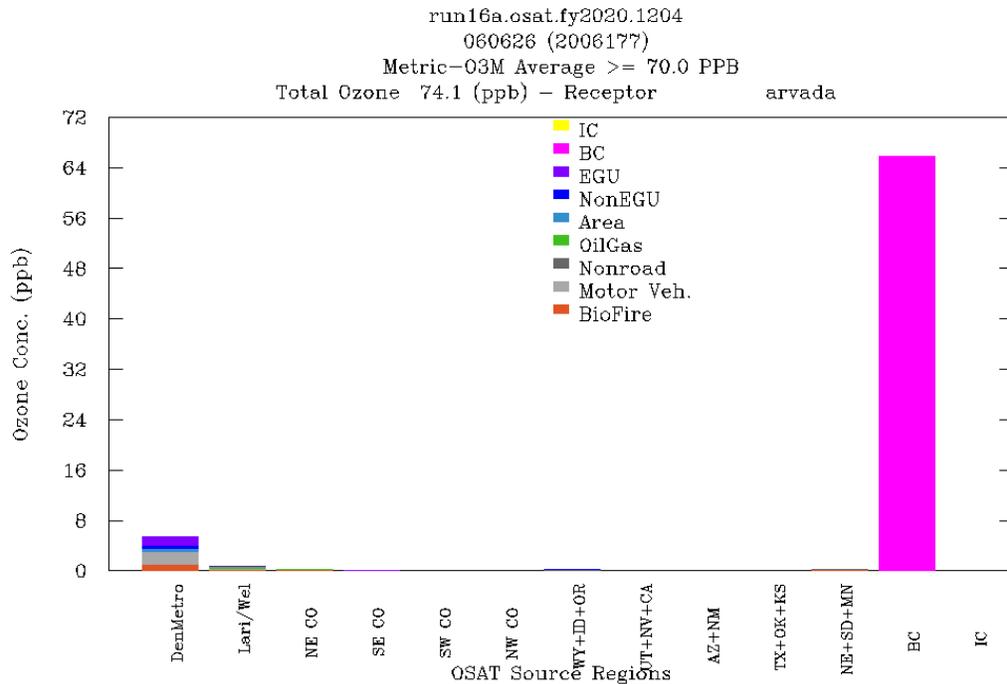
attainment region. That modeling shows that the largest projected share of ozone on any given day comes from the boundary conditions -- represented in yellow below. Alpine's analysis of alternative days demonstrates that while the relative values may differ from day to day, ozone present in the boundary conditions remains overall the single largest contributor to ozone values on any given day. Source apportionment of non-boundary sources of ozone show that natural sources (biogenics), shown in pink below, also contribute significantly to the overall ozone levels. On some days, biogenic emissions are the second highest source of ozone. Such modeling suggests that elimination of all anthropogenic emission sources would not lower the standard sufficiently to bring the area into attainment with the standard at the levels proposed by EPA.

Deer Park: $DV_f = 97.7$ ppb



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Modeling of ozone formation within the Denver metropolitan area provided similar conclusions regarding the role of boundary conditions (labeled BC and shown in pink below).. On a day when total ozone levels were recorded at 74.1 ppb, boundary conditions based on air quality monitoring showed ozone levels exceeding 64 ppb. Of the relatively small levels of ozone produced locally, fires and other biological sources appeared as a significant contributor, ranking third after motor vehicle related emissions and electric generation emissions.



These examples illustrate the relatively small share of ozone in a given region that is produced from local sources. For western rural areas, the case is even more dramatic. The lack of significant local and regional anthropogenic emission sources may be one of the primary reasons why ozone levels have not declined in the west since 1996. Further, the relatively low contribution of domestic human generated emission sources throughout these large areas suggests that regional control strategies may not be able to control ozone to achieve the levels proposed by EPA and, these will perpetually be in nonattainment.

As indicated by the Jaffe studies above, monitored values of ozone in our nation's pristine parks and other remote areas are routinely found in the 30 – 50 ppb range, and in some areas at a range of 40 to 60 ppb, much higher than the estimate from the GEOS-CHEM model used by EPA for the risk assessment. In fact, in more recent 2009 study, Zhang et al. noted that observed readings at Mt. Bachelor Observatory on the coast of Oregon, and at Trinidad Head, Northern California, ranged from 54 ppb (± 10 ppm) at the former to 41 ppb (± 7) (3-hour

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Page 15

averages) at the latter during a one month period from April 17 to May 15, 2006.²⁶ This was early in the ozone season and values are likely to be even higher later in the year. The final 2007 Staff Paper also noted that the monitored values at Trinidad Head are “especially relevant because sources of the O₃ [ozone] found there are often limited to those in the PRB [Policy Relevant Background] definition.”²⁷ The maximum monthly diurnal average at Trinidad Head was .050 ppm.

Exhibit 3 to these comments, attached, shows EPA’s data on the 8-hour ozone design values for many national forests, parks, and other similar areas throughout the country. All of these design values have exceeded 50 ppb over the past decade, and some approach or even exceed the current 75 ppb standard.

Researchers at Harvard who assisted in the development of the GEOS-CHEM model used by EPA, have noted the problem of relatively high background rates of ozone (Fiore et.al 2002).²⁸ After analyzing background ozone concentrations across the U.S., the researchers conclude that ozone background contributions of 25 to 40 ppbv were found during 9 percent of ozone exceedances. They further note that anthropogenic emissions in Asia and Europe are increasing ozone concentrations in surface areas over the U.S. by typically 4 to 7 ppbv, and on some days up to 14 ppbv for ozone concentrations in the 50 to 70 ppbv range. Importantly, the authors conclude that this “would represent a major concern if the NAAQS were to be tightened.”²⁹

These concerns have been validated by research conducted by Cooper et al, 2010. The researchers found that background air entering western North American (after filtering possible local sources of pollution) resulted in a median rate of increase of 0.71 ± 0.29 ppbv/yr for 1984 to 2009, suggesting close to an overall increase of close to 18 ppbv from transport entering the U.S.

Another contributor on high ozone days that could lead to non-attainment of ozone standards throughout the country is forest fires. During 1995, there were several large forest fires in Northwest Canada in the summer months. Using monitoring data from several southeastern and Atlantic coast states, the American Association for the Advancement of Science concluded that “Regional background ozone concentrations were elevated by 10 to 20 ppb” during these forest fire episodes (Trainer & Wotawa, 2000).

Another week long forest fire in northern Utah during July 28-Aug 3, 2000 impacted ozone concentrations for the entire area monitoring network.2000. The significant impact from

²⁶ Zhang, L., D. J. Jacob, M. Kopacz, D. K. Henze, K. Singh, and D. A. Jaffe (2009), “Intercontinental source attribution of ozone pollution at western U.S. sites using an adjoint method,” *Geophys. Res. Lett.*, 36, L11810, doi:10.1029/2009GL037950. The study indicated that Mount Bachelor Observatory “is a mountain site in central Oregon that is particularly sensitive to Asian influences due to its exposure to the free troposphere [Jaffe et al., 2005; Weiss-Penzias et al., 2006; Wolfe et al., 2007]” and that Trinidad Head “on the northern California coast is widely used as a surface background site for the United States [Goldstein et al., 2004; Oltmans et al., 2008; Parrish et al., 2009].” *Id.* at p.2 of 5.

²⁷ 2007 SP at 2-54.

²⁸ Arelene M Fiore, Daniel J. Jacob, Isabelle Bey, Robert M. Yantosca, Brendan D. Field, and Andrew C. Fusco, “Background ozone over the United States in summer: Origin, trend and contribution to pollution episodes” *Journal of Geophysical Research*, Vol. 107, No. D15, 2002.

²⁹ *Id.*

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Page 16

the fire was analyzed by Delaney, 2004. In his review, Delaney related that prior to the fire, ozone at the 11 area monitors ranged from 0.04 to 0.08 ppm. During the days associated with the fire, ozone increased to 0.08 to 0.15 ppm, then dropped down to pre-existing levels within a day or two after the fire.

In a more recent review, Jaffe et al, 2008 also found that large fires in the U.S. significantly raised ozone levels.³⁰ The authors noted that such fires produce a significant amount of hydrocarbons and NOx. The study determined that for each one million acres burned in the western U.S. during the summer, mean daytime ozone concentrations across the region were raised by 2.0 ppbv. For mean and maximum fire years, ozone was enhanced by an average of 3.5 and 8.8 ppbv respectively.³¹

Domestic fires are not the only source of such emissions. A Siberian fire in 2003 was determined to cause an “average enhancement” in ozone concentrations at monitoring sites in Washington state and British Columbia, including Tahoma Woods, Jackson Visitor’s Center, Saturna Island and the North Cascades National Park, from June 1–6th, 2003, “between 9 and 17 ppbv.”³² Researchers studying the impact of biomass burning in Eurasia during April 2008 found that usually high ozone readings at surface monitoring sites from northern California to northern Alaska. (Oltmans, et al 2008) At Denali National Park in central Alaska, an hourly average of 79 ppbv was recorded during an 8-hour period in which the average was over 75 ppbv. Normally, the researchers note that it is unusual for the Denali Park to experience hourly average occurrences greater than 60 ppbv. The researchers further suggest that the Eurasian biomass burning impacted the monitors in the interior of the U.S. through a northern tier of states (Montana, Wyoming, and North Dakota).

B. CASAC Should Advise EPA to Use Modeled Rather Than Monitored Ozone Levels to Establish Policy Relevant Background

EPA used monitoring data to establish policy relevant background for the 1997 primary ozone NAAQS. EPA indicated in the Preamble for the rulemaking on that standard that background levels from natural sources averaged 0.04 ppm, but sometimes peaked near 0.07 ppm.³³ EPA had been considering whether to lower the standard to 0.07 ppm, but determined such would be inappropriate and not requisite for public health protection as that level was so close to background. EPA stated:

3) As many commenters have noted, based on information in the Criteria Document with regard to ambient concentrations of O₃ from background sources, an 8-hour standard set at a 0.07 ppm level would be closer to peak background

³⁰ Dan Jaffe, Dulichand, Willhafner, Anthony Westerline, and Dominick Spracklens, “Influence of Fires on O₃ Concentrations in the Western U.S.,” 2008, *Environ. Sci. Technol.* 2008, 42, 5885–5891

³¹ *Id.*

³² Dan Jaffe, Isaac Bertschi, Lyatt Jaegle, Paul Novelli, Jeffrey S. Reid, Hiroshi Tanimoto, Roxanne Vingarzan, and Douglas L. Westphal, “Long-range transport of Siberian biomass burning emissions and impact on surface ozone in western North America,” *Geophysical Research Letters*, VOL. 31, L16106, doi:10.1029/2004GL020093, 2004.

³³ 62 Fed. Reg. at 38,868

levels that infrequently occur in some areas due to non-anthropogenic sources of O₃ precursors, and thus more likely to be inappropriately targeted in some areas on such sources. After taking into account the public comments, and for the reasons outlined above, the Administrator finds that a standard set at a level of 0.07 ppm is not requisite to protect public health with an adequate margin of safety.

In the process for developing the 2008 standard (0.075 ppm), the EPA Staff Paper lowered its estimate of background ozone levels from the levels used in 1997 to hourly values that range from 0.15 to 0.035 ppm.³⁴ The agency did this by replacing monitored values in the U.S. with modeled values from a global model called GEOS-CHEM. This model excludes any man-made ozone from Canada and Mexico as well as the U.S. It also excludes any ozone from agricultural or livestock raising activities within the U.S. The CASAC raised concerns about EPA's proposed lower estimate of background ozone concentrations in a March 2007 letter to EPA.³⁵

Finally, with respect to policy-relevant background (PRB), the Ozone Panel wishes to point out that the Final Ozone Staff Paper does not provide a sufficient base of evidence from the peer-reviewed literature to suggest that the current approach to determining a PRB is the best method to make this estimation.

LCA agrees – EPA has yet to provide any reasoned statement concerning why modeled ozone values should be used for background rather than monitored values. Nor has EPA responded to criticisms concerning the validity of the GEOS-CHEM model. The data from the numerous studies above concerning foreign emissions and natural emissions from forest fires consistently indicate that background values exceed the range selected by EPA as PRB. The unrealistic nature of EPA's PRB makes it arbitrary for policy decision making and risk analysis.

1. GEOS-CHEM should not be used because it fails to simulate local maxima and not been adequately validated.

Research has shown that uncontrollable ozone levels fluctuate greatly due to a number of factors, including changes in biogenic emissions, temperature, stratospheric ozone intrusions and international transport. In the 1997 review, EPA assessed ozone background concentrations based on measured observations. Because compliance is based on the fourth highest eight hour reading over four years at actual ambient monitoring sites, the extremes of the distribution of the daily ozone background maxima, as well as the means, must be evaluated. In previous ozone reviews, both the means and extremes of background were evaluated, as noted by the EPA's Staff Paper:

i....a reasonable estimate of the background O₃ concentrations near sea level in the U.S. for a 1-hour daily maximum during the summer is usually in the range of

³⁴ 2007 EPA Staff Paper, 5-92.

³⁵ (March 2007 CASAC letter at p. 2).

0.03 to 0.05 ppm. At clean sites in the western U. S., the maximum annual hourly values are in the range of 0.06 to 0.075 ppm.

ii. (2006 SP at 20). **In the current review, the 2006 CD discusses estimates of background concentrations from both observations and models, but the 2007 SP relies almost entirely on one global chemical transport modeling study based on 2001 data to model an estimated mean background. The CD, however, notes several important limitations of that study and further notes the need for additional work to evaluate PRB with an ensemble of models to compare model results with observations.** This important validation work has yet to be done.

The large grids in the global model mix air parcels of different composition and origin in an unrealistic way, severely limiting its ability to accurately simulate local photochemical activity, intercontinental transport, and the impact of stratospheric air inserted into the troposphere. The 2006 Criteria Document notes the need to include models with greater resolution to understand variability on shorter time scales and variability due to processes that are not captured in the global models. Until this is done, EPA should use a range of background estimates from observations. Over the past several years, states have begun to employ more sophisticated air quality modeling that allow for finer grid resolution and the evaluation of maximum values. As noted above the results of these models differ significantly with regard to estimated ozone background levels. The failure to provide information on the extremes of background remains a serious omission. As a result, CASAC should inform EPA that use of such modeled ozone background data is not scientifically supportable and it should be disregarded.

2. Ozone transport has increased significantly since 2001 -- the year the GEOS-CHEM model was run -- and is expected to continue to rise due to increases in Asian emissions

The new data presented above indicate that the GEOS-CHEM model may significantly underestimate the contribution of emissions from outside of North America, and as a result, the overall ozone background levels. The GEOS-CHEM model provides estimates of ozone background concentrations for the year 2001. Data compiled under the Center for Global and Regional Environmental Research (see Table 8) show that estimates of nitrogen oxide emissions have increased by over 60 percent from Asia since 2000. The authors note that some of this increase is due to growth in emissions while some is due to improvements in emission inventory and record keeping. The magnitude of this increase since 2000, however, suggests that the GEOS-CHEM model may significantly underestimate the level of NO_x emissions and ozone attributable to sources outside North America.

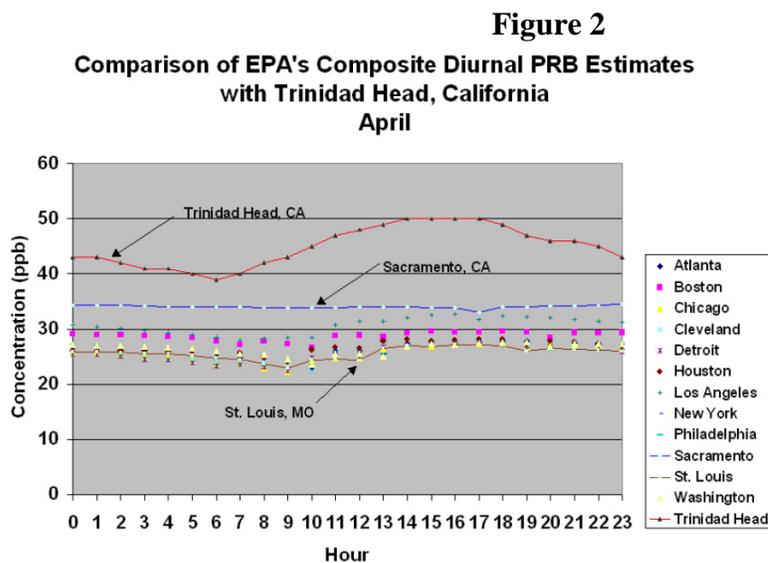
Additional research by Roxanne Vingarzan confirms the significance of the long-range transport of Asian emissions on North American ozone levels that could exceed internationally

accepted environmental criteria for human health and the environment.³⁶ Vingarzan, *et al.*, further note that the International Panel on Climate Change (“IPCC”) projections indicate that surface ozone levels are expected to “rise significantly throughout the 21st Century”³⁷ with half the rise due to increases in methane emissions and the other half due to increases in NOx emissions. She notes that the projections exceed internationally accepted environmental criteria, ranging around 40 to 50 ppb. Vingarzan concludes: “Given that these values represent background conditions, any additional ozone production associated with smog episodes would make it very difficult to achieve a clean air standard of < 80 ppb over most populated regions.” (citing IPCC, 2001)

Vingarzan’s conclusions appear all the more valid given that the IPCC projections are based on 2001 data, before the increase in NOx emissions from Asia was recorded. The rapid increases in Asian emissions suggest that background levels in North America will have already risen significantly from emissions outside North America and that the GEOS-CHEM model has significantly under-predicted their contribution.

C. By Significantly Underestimating PRB, EPA Significantly Overestimates the Potential Risk Reduction Benefits From Tightening the Ozone Standard.

Assumptions regarding ozone background concentrations play a key role in determining the potential health risk benefits from lowering the ozone standard. The differences in ozone values between the GEOS-CHEM model for selected cities and monitored values at the Trinidad Head, a site EPA has acknowledged as being reflective of background concentrations, are shown in Figure 2 from Dr. Lefohn’s February 28, 2007 CASAC testimony:



³⁶ R. Vingarzan, “A Review of Surface Ozone Background Levels and Trends,” (Atmospheric Environment 38, 3431-3442 (2004).

³⁷ *Id.* at 3437)

Figure 1. Comparison of EPA's composite diurnal PRB O₃ estimates with Trinidad Head, CA for April. Source: Oltmans and Lefohn (2005).

As discussed above, EPA's estimate of health benefits for a lower ozone standard is significantly affected by the choice of ozone level to be used in determining ozone background levels. Dr. Lefohn estimated that for each increase of 5 ppb in the Policy Relevant Background, at an 8-hour ozone standard level of 0.074 ppm, there was a 72% reduction in projected benefits of ozone related non-accidental mortality, and at a standard level of 0.64 ppm, a reduction of 86% of the estimated benefits. The Associations contend that the PRB is underestimated by at least 10-20 ppb, if not more, given the information presented in these comments.

The sensitivity of health risk benefits (mortality and non-mortality) projected to PRB was confirmed by a CRA International. CRA reproduced the sensitivities that EPA (and Dr. Lefohn) reported, and also demonstrated that if EPA had used a higher summer estimate of average ozone background levels of 0.04 ppm (which was used in EPA's 1997 review rather than the lower value that EPA is using in the 2007 review), the estimated number of potential deaths and other health effects projected at just attaining the current standard for the city of Houston and Detroit would fall by over 95 percent. This sensitivity in the estimated risk would apply to tighter standards as well.

III. Conclusions

The 2008 ozone standard was determined to be the appropriate level requisite to protect public health after review of a great deal of scientific data clothed with a substantial level of uncertainty. None of the data considered by EPA showed strong evidence of any adverse public health impact below a level of 0.08 ppm 8-hour average. Further, the degree of conservatism inherent in the policy relevant background used by EPA for the 2008 standards provides an ample margin of safety to continue with the 2008 standards while reviewing data that may reduce such uncertainties.

The Associations members have demonstrated their commitment to air quality and have, in large part, been responsible for the state of Louisiana now meeting the 1997 ozone standard. Further, only one monitor in the entire state currently has a design value above 75 ppb. The Associations also support the efforts of their members in maintaining good jobs for the people of Louisiana. Such jobs enable many citizens within the state to have health care and a quality of life conducive to good health. The Associations have refrained from submission of economic data to the CASAC for these comments as such is beyond the EPA charge. However, the CASAC should, by now, be aware that the results of lowering the ozone standard to the levels in the 60-70 ppb range will require draconian reductions of human generated ozone precursors that will engender devastating economic impacts. That these adverse economic impacts will result in adverse health impacts cannot be doubted.

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Page 21

The Associations believe it is incumbent upon the CASAC to advise EPA that it should not lower the current standard (which is conservative and employs a margin of safety) absent very strong evidence that such lowering is needed. That evidence does not currently exist.

The Associations request that CASAC advise EPA to withdraw the proposed reconsideration rule at this time and focus its efforts on implementing the 2008 75 ppb 8-hour standard. We believe that a thorough and complete review of the most recent scientific evidence, pursuant to the full Clean Air Act 5-year NAAQS review process is the appropriate path for EPA and the CASAC to follow for making any further revisions.

Thank you for your consideration of these comments.

Very truly yours,

[Signed copy sent via US Mail]

Maureen N. Harbourt
Counsel for the Louisiana Chemical Assn. and
The Louisiana Mid-Continent Oil and Gas Assn.

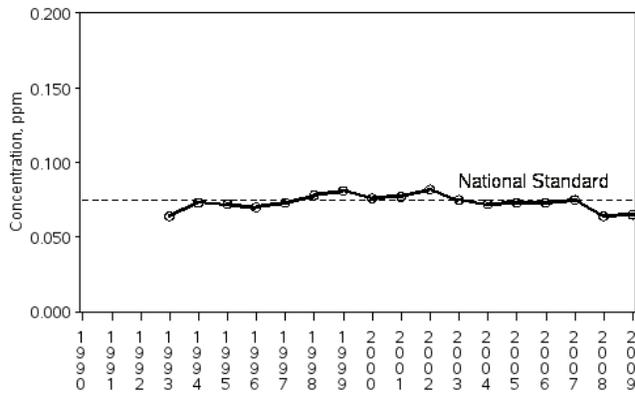
Exhibit 3: EPA Ozone Data from National Parks
(All data from <http://www.epa.gov/airtrends/ozone.html>)

Ozark National Forest – Newton Co. – Arkansas

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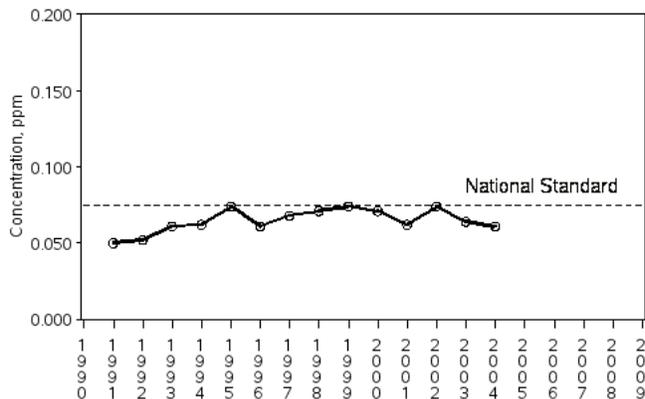
Page 22

Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
Newton County
SITE=051010002 POC=1



Ouachita National Forest – Montgomery Co. Arkansas

Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
Montgomery County
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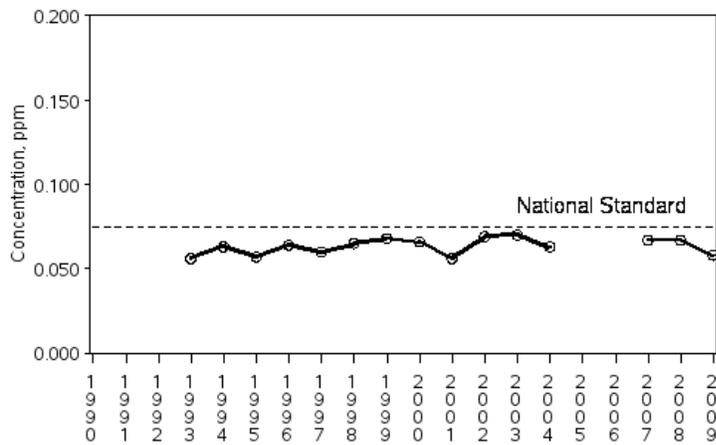


Craters of the Moon National Monument – Butte Co., Oregon

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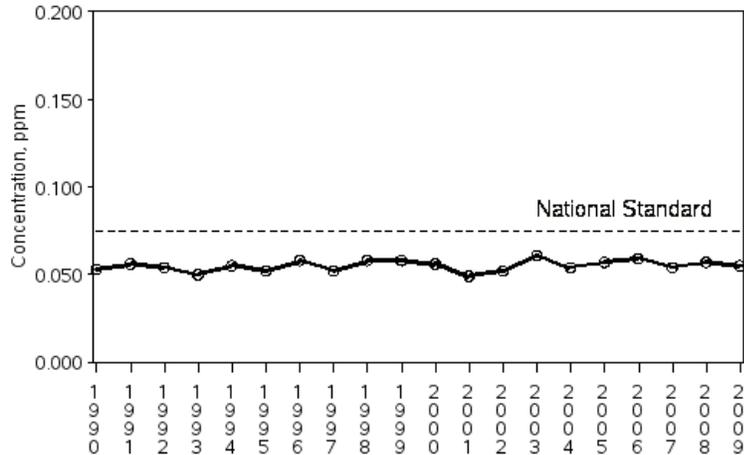
Page 23

Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
Butte County
SITE=160230101 POC=1



Flathead National Forest – Flathead Co., Montana

Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
Flathead County
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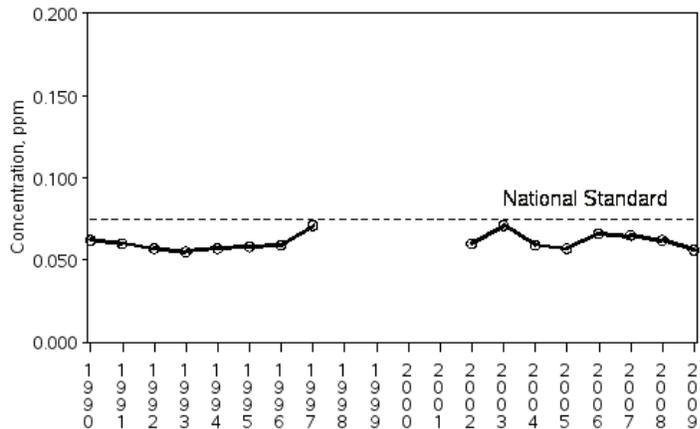


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Page 24

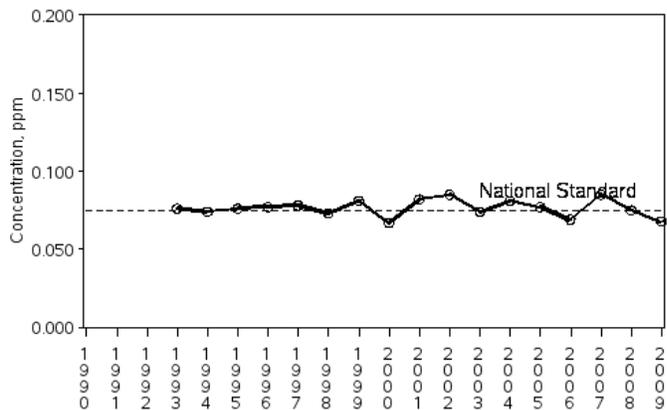
Little Missouri National Forest – McKenzie Co., North Dakota

Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
McKenzie County
SITE=380530002 POC=1



White Mtn. National Forest – Coos Co. Vermont and Oxford Co., Maine

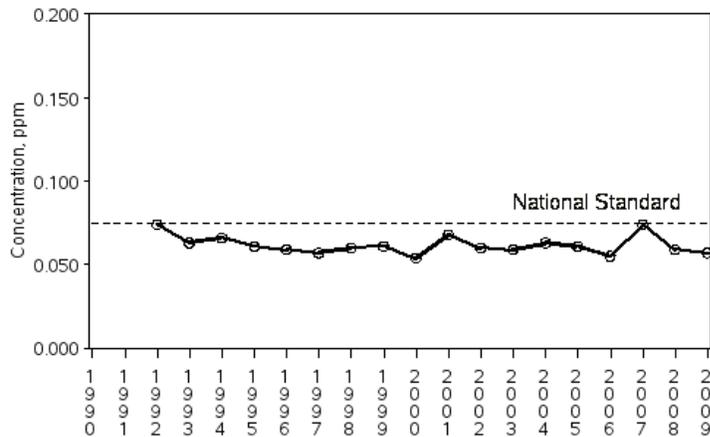
Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
Coos County
SITE=330074001 POC=1



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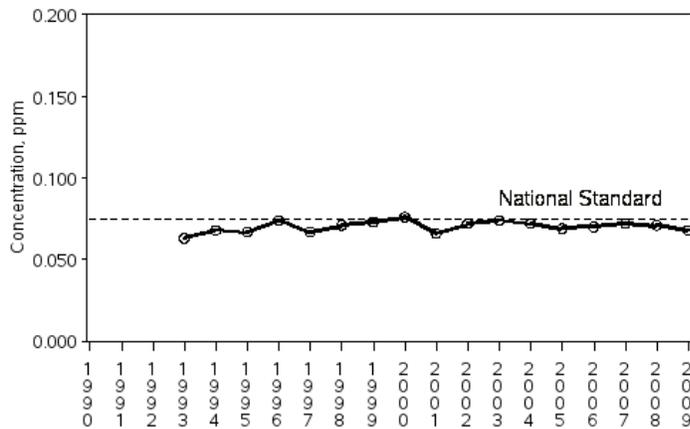
Page 25

Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
Oxford County
SITE=230173001 POC=1



Canyon Lands National Park – San Juan Co., Utah

Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
San Juan County
SITE=490370101 POC=1



Nantahala National Forest – Oconee Co., South Carolina

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Page 26

Ozone Air Quality, 1990 - 2009
(Based on Annual 4th Maximum 8-Hour Average)
Oconee County
SITE=450730001 POC=1

