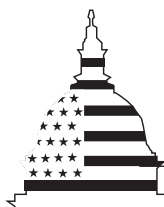


July 1999

AIR POLLUTION

The Border Smog Reduction Act's Impact on Ozone Levels



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United States General Accounting Office
Washington, D.C. 20548

**Resources, Community, and
Economic Development Division**

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The Honorable John H. Chafee
Chairman
The Honorable Max Baucus
Ranking Minority Member
Committee on Environment
and Public Works
United States Senate

The Honorable Thomas J. Bliley, Jr.
Chairman
The Honorable John D. Dingell
Ranking Minority Member
Committee on Commerce
House of Representatives

Ground-level ozone, a major component of smog, is a persistent air quality problem in several areas of the country. The recently enacted Border Smog Reduction Act of 1998 addresses one aspect of the problem, which involves reducing ozone-causing chemicals from certain foreign-registered vehicles.¹ The act currently applies only to the San Diego metropolitan area and amends the Clean Air Act to prohibit certain foreign-registered, noncommercial vehicles from entering the area more than twice a month unless they have complied with California's inspection and maintenance requirements.² The act authorizes fines of up to \$400 per violation, and the U.S. Customs Service and the Immigration and Naturalization Service plan to cooperate in enforcing the act.

While the Border Smog Reduction Act addresses emissions from certain passenger vehicles, it does not address those from commercial vehicles, such as trucks, which are also a source of ozone-causing chemicals. The effect of increased commercial vehicle traffic on air quality has been of particular concern since the North American Free Trade Agreement (NAFTA) was implemented in January 1994. This agreement created

¹P.L. 105-286 (1998).

²The act does not specifically mention San Diego or California, but they are the only jurisdictions meeting criteria specified in the act.

incentives to encourage trade between Mexico and the United States and has been responsible, in part, for the growing number of trucks traveling in the border region.

The Border Smog Reduction Act required us to study the act's potential impact. As agreed with your offices, we focused on measured ozone levels and the impact of NAFTA on ozone in the San Diego area. Specifically, we determined (1) what estimates were available of the act's potential impact on ozone-causing chemicals in the San Diego area and (2) trends in commercial border traffic and ozone levels in the San Diego area before and after NAFTA was implemented.

Results in Brief

The California Air Resources Board, a state agency that regulates air quality, estimated that the Border Smog Reduction Act would reduce ozone-causing chemicals in San Diego County by less than 0.5 percent annually. This calculation was based on an estimated number of foreign-registered vehicles that would be subject to the act's provisions. The act's impact is difficult to estimate because data are not available on the number and condition of foreign-registered vehicles entering the United States and a variety of factors influence measured ozone levels.

The trend in commercial truck crossings into the United States from Mexico was generally upward both before and after NAFTA was implemented in January 1994. At the same time, the trend in measured ozone levels in the San Diego area was generally downward. Several factors contributed to the decrease in ozone levels, including efforts by San Diego County and California state officials to tighten the standards for passenger vehicle emissions and to encourage the use of cleaner formulations of gasoline. Because a number of factors affect measured ozone levels, it is difficult to isolate the impact of a single factor, such as commercial truck traffic.

Background

Ozone results from a reaction between two groups of chemicals, nitrogen oxides and volatile organic compounds, in the presence of sunlight and warm temperatures. Often, when strong winds are present, ozone may travel hundreds of miles from its source. As a result, a region that may have relatively low levels of ozone-causing chemicals may nonetheless experience high levels of ozone. Motor vehicle exhaust is a significant source of ozone-causing chemicals. Other common sources include

chemical solvents from dry cleaners and fossil fuel combustion from industrial facilities. Ozone, a major component of smog, is a strong irritant that can cause restriction of the airways, forcing the respiratory system to work harder to provide oxygen to the body. Clinical studies show that chronic exposure to smog reduces lung capacity, lowers stamina, and leaves people vulnerable to long-term respiratory problems.

The Clean Air Act establishes standards for atmospheric ozone that many areas within the United States currently fail to meet. The act requires states to develop plans to reduce ozone levels in these areas. Such plans must establish, among other things, vehicle inspection and maintenance programs to monitor and enforce emission limits. In 1993, California passed a law requiring certain vehicles registered outside the state, including those registered in Mexico, to comply with its inspection and maintenance requirements.³ Although Mexico has emission standards for several pollutants, including ozone-causing chemicals, the enforcement of these standards is often weak, according to Mexico's Director of Air Quality for the National Institute of Ecology and an air quality expert with the San Diego Air Pollution Control District. California found the enforcement of its law difficult for vehicles entering from Mexico because monitoring the border area is a federal responsibility. The Border Smog Reduction Act makes vehicles violating this California law subject to federal enforcement.

The Border Smog Reduction Act became effective on April 27, 1999. On that date, the U.S. Customs Service and the Immigration and Naturalization Service began a 60-day effort to inform targeted members of the public—specifically, commuting workers and students—of the act's requirements. During this trial period, inspectors with those agencies provided verbal warnings to drivers who did not have documentation showing that they were in compliance with the act. After this 60-day period, officials planned to enforce the act at random intervals. Verbal warnings would continue for drivers who were not in compliance and were crossing the border for the first or second time in a calendar month. Drivers not in compliance and attempting to cross the border a third time in a calendar month would be referred to local law enforcement authorities or returned to Mexico if local officials were not available.

³Cal. Health and Safety Code, secs. 44011, 44011.1.

In addition to passenger vehicles, commercial traffic is a major contributor to ozone-causing chemicals in the San Diego area. NAFTA, which went into effect on January 1, 1994, was intended to facilitate trade and investment throughout North America. Since the implementation of NAFTA, cross-border trade has increased. Imports from Mexico grew by 86 percent from 1993 through 1996, while imports from all other sources grew by 33 percent, raising Mexico's share of total U.S. imports by 2.4 percent, to 9.3 percent in 1996. This increase has meant that more trucks are traveling in the border regions and has raised concerns about the impact of increased truck traffic on air quality.

Act's Estimated Impact on Ozone Levels

The California Air Resources Board, the state's air quality authority, estimated that the Border Smog Reduction Act would decrease the emission of ozone-causing chemicals by less than 0.5 percent annually. The agency based its calculation on the number of vehicles subject to the provisions of the act—foreign-registered cars entering the county more than twice a month—estimated at 7,000 each day. This number is equal to 0.37 percent of the 1.9 million cars and light-duty trucks registered in San Diego County. However, according to U.S. Customs Service officials, data on the actual number of vehicles affected by the act and the condition of these vehicles—including their age and how much pollution they produce—are not available. California air quality experts who have reviewed the act said they believed its impact on air quality, including measured ozone levels, would be relatively minor. An Environmental Protection Agency (EPA) air quality expert we interviewed said that whether there will be a decrease in measured ozone levels corresponding to the decrease in ozone-causing chemicals is unclear. Several additional factors affect the formation of ozone, such as chemicals from other sources and weather conditions.

A San Diego air quality official, however, said that in order to reduce overall emissions of ozone-causing chemicals in the county, it is necessary to address even seemingly minor emitters, such as the population of foreign-registered vehicles affected by this act. Additionally, some U.S. Customs Service agents working at one San Diego County port of entry said they believed any improvement in air quality brought about by the act would be beneficial. Thousands of vehicles cross this border area into the United States daily and, according to U.S. Customs officials, must often wait in line for at least 20 minutes. This number of vehicles idling in one location produces concentrated pollution that creates a health concern among those working at the border.

The state of California and San Diego County routinely monitor air quality and emissions, but a San Diego air quality official told us there are currently no formal studies planned to monitor the effects of the act. Officials with these agencies said that showing a causal relationship between the act and any decrease in measured ozone levels would be difficult because of the many factors that contribute to the formation of ozone.

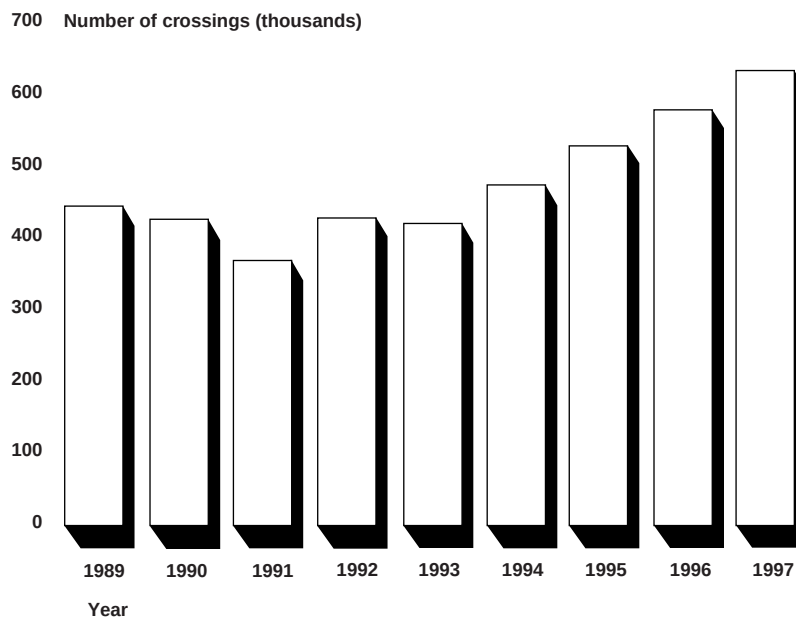
Upward Trends in Commercial Traffic From Mexico and Downward Trends in Measured Ozone Levels

During the past decade, there has been a general upward trend in the number of northbound commercial truck crossings at ports of entry in the San Diego area. Contributing to this increased traffic is the higher volume of cross-border trade encouraged by NAFTA, according to a Federal Highway Administration official specializing in the impact of NAFTA. Although the San Diego County Air Pollution Control District considers truck traffic a major contributor to ozone-causing chemicals, measured ozone levels in the San Diego area have generally declined. However, California air quality experts told us it is difficult to establish a causal relationship between ozone levels and increased truck traffic because the presence of ozone in the area is influenced by several factors, and fluctuations may or may not occur as a result of changes in truck traffic.

As shown in figure 1, traffic counts at the three San Diego County border crossing points for commercial trucks⁴ increased from 1992 to 1997. Crossings rose from 429,000 in 1992 to 635,000 in 1997, an increase of 48 percent. Although the upward trend began in 1992, commercial truck traffic increased at a higher rate after January 1994, the date NAFTA took effect. An official with the Federal Highway Administration told us this increase was due, in part, to the trade agreement, which, through reduced tariffs and other provisions, created incentives for greater cross-border trade. A San Diego County official told us that other factors, such as fluctuations in the Mexican economy, might have affected trade as well.

⁴The ports of entry in San Diego County that currently process commercial traffic are Otay Mesa and Tecate. San Ysidro stopped processing commercial traffic in 1992.

Figure 1: Northbound Commercial Truck Crossings at San Diego County Ports of Entry, 1989-97



Note: Truck crossing data were not available for November 1995 at Otay Mesa. Thus, we estimated the number of crossings by using a simple average of the preceding and following months.

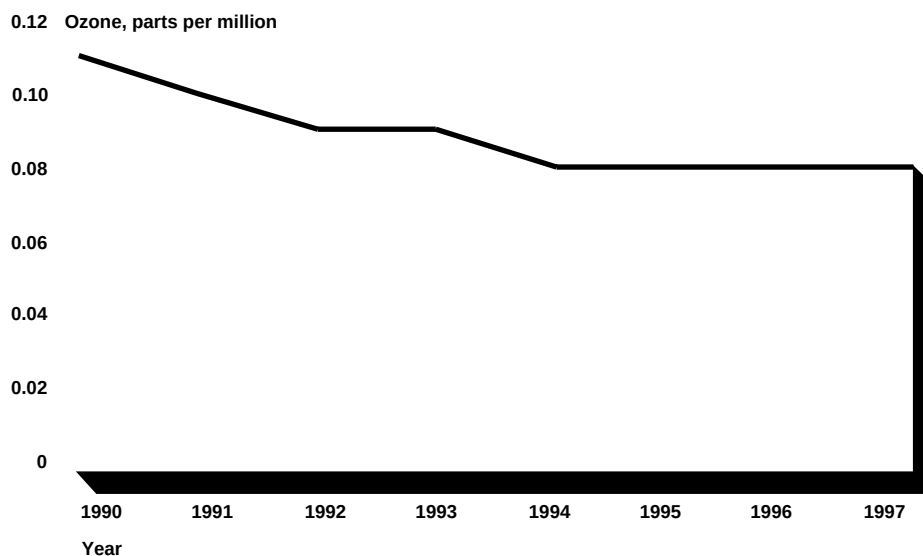
Source: GAO's analysis of the U.S. Customs Service's data.

Concerns have been raised that greater volumes of trade may exacerbate environmental problems along the border, including air pollution. Air quality experts we interviewed said they believed that imposing stricter regulations on emissions from commercial trucks would be more effective in reducing ozone levels than targeting passenger vehicles. According to a San Diego air quality expert, commercial trucks have higher emissions per vehicle than cars for one type of ozone-causing chemical. Currently, commercial trucks traveling in California are not subject to routine emission inspections but may participate in voluntary self-inspections. An EPA official in Region IX (San Francisco), however, stated that there is a difference between emissions from gasoline- and diesel-powered trucks and that the issue of testing and requiring repairs should be further studied to determine the impact on ozone-causing chemicals.

While the number of commercial trucks entering San Diego County from Mexico in the past decade has been generally increasing, measured ozone levels in San Diego County have been on a downward trend. Ozone

decreased by 27 percent from 1990 through 1994 and remained stable from 1995 through 1997 (see fig. 2).⁵ San Diego County and California state air quality officials said that the decrease in ozone and ozone-causing chemicals was due, in part, to their efforts to implement pollution controls, including emission standards for automobiles and cleaner formulations of gasoline.

Figure 2: Ozone Levels for San Diego County, 1989-97



Note: Measurements given are for the fourth-highest daily maximum 8-hour concentration of ozone, averaged over a 3-year period. Thus, the number for 1997, for example, reflects air quality for the years 1995 through 1997.

Source: GAO's analysis of EPA's data.

Although ozone-causing chemicals—emitted by cars and trucks, among other sources—are necessary for the production of ozone, the increased production of these chemicals does not necessarily result in higher ozone levels in the same area, according to EPA. Several other conditions affect the level of ozone measured in a given area. For instance, ozone levels in the greater Los Angeles area affect the amount of ozone present in San Diego because the prevailing winds, which blow from northwest to

⁵The measurement used to calculate this change was the fourth-highest daily maximum 8-hour concentration.

southeast, transport ozone from Los Angeles to San Diego, according to California officials. A California Air Resources Board official told us that improvements in recent years in San Diego's air quality correlate with improvements in the Los Angeles area.

Additionally, fluctuations in measured ozone levels may be a result of other weather conditions. For ozone to form, ozone-causing chemicals must be exposed to sunlight and heat. As a result, ozone levels are generally higher in summer months than in winter months. Likewise, a San Diego air quality expert told us that during a particularly cloudy or cool year, ozone levels may decrease regardless of whether the production of ozone-causing chemicals has increased.

Agency Comments

We provided the U.S. Environmental Protection Agency and the U.S. Customs Service with a draft of this report for review and comment. In commenting for the EPA, officials in the agency's Office of Air and Region IX (San Francisco) said that the agency generally agreed with the report but would find more information on how the ozone reduction estimate was calculated helpful. We were not provided with a complete description of the California Air Resources Board's estimate and therefore did not add this information to the report. The officials also noted that emissions from different types of commercial vehicles need to be tested differently. We added this information to the report. The Director of the U.S. Customs Service's Office of Planning generally agreed with the information in the report and made technical suggestions, which we incorporated into the report.

Scope and Methodology

To determine the estimates that were available on the potential impact of the Border Smog Reduction Act of 1998, we interviewed officials with the California Air Resources Board, the San Diego Air Pollution Control District, San Diego State University, the U.S. Customs Service, and the U.S. EPA. We reviewed the estimate prepared by the California Air Resources Board on the potential impact of the act and gathered information on the planned implementation of the act, including attending a planning session on the act's implementation. The data used in the California Air Resources Board's estimate were not independently verified for accuracy.

To determine the changes in the volume of traffic from Mexico through San Diego border crossings before and after the implementation of NAFTA, we

obtained data on commercial truck crossings from the U.S. Customs Service for the period from 1989 through 1997. We analyzed these data to identify the trends in commercial traffic. To determine the changes in measured ozone levels in the San Diego area before and after the implementation of NAFTA, we obtained information on the formation of ozone and the factors that influence ozone levels in the San Diego area. We also obtained ozone data from EPA for the San Diego area and analyzed these data to identify trends for the period from 1989 through 1997. We did not independently verify the traffic or ozone data for accuracy. We performed our work from March 1999 through June 1999 in accordance with generally accepted government auditing standards.

We are sending copies of this report to the Honorable Carol Browner, Administrator, the Environmental Protection Agency; the Honorable Raymond Kelly, Commissioner, U.S. Customs Service; and other interested parties. We will make copies available to others on request.

If you have any questions about this report, please contact me at (202) 512-6111 or John Wanska at (312) 220-7628. Key contributors to this assignment were Heather J. Halliwell, Richard P. Johnson, Rosemary Torres Lerma, and D. Alan Rogers.

A handwritten signature in black ink that reads "David G. Wood". The signature is written in a cursive, flowing style.

David G. Wood
Associate Director, Environmental
Protection Issues

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