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THE STATE

As Smog Thickens, So Does the Debate

By Miguel Bustillo, Times Staff Writer

As Southern California experiences a resurgence of smog, a growing number of scientists say the government's long-standing strategy for reducing air pollution may be making it worse.

The doubts have arisen because ozone, the main ingredient of smog, is becoming more common in Los Angeles and many other large cities on weekends, when big trucks and other heavy polluters are least active.

Known as the "weekend effect," the phenomenon has long perplexed scientists and air pollution officials, who remain divided over why ozone is so abundant Saturdays and Sundays.

Now, some scientists, armed with new research about the weekend effect, are suggesting that environmental officials may be putting too much emphasis on the wrong pollutant because they misunderstand how smog forms in the atmosphere.

The dispute centers on one of the two main groups of chemicals that react to form ozone: nitrogen oxides, which are released into the air when fuel burns. Air quality regulators have pushed hard to reduce those chemicals as much as possible. It's been a costly process, particularly for the auto industry, and some scientists say it may be time to pull back.

"It seems like motherhood and apple pie to reduce pollutants. That sounds like a common-sense approach," said Douglas R. Lawson of the National Renewable Energy Laboratory in Colorado.

"But things are not that simple. The more intelligent way to approach the question of pollution controls is: How will the atmosphere respond to the changes?"

Lawson and those who agree with him argue that regulators should put less emphasis on nitrogen oxides and focus more on reducing the other main constituent of ozone, a class of chemicals called volatile organic compounds. Those compounds have many sources, natural and man-made, including household cleaners, cars and trees.

A lot is at stake in the debate.

Auto industry groups have tried to use the weekend effect as a rationale for weaker

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antipollution rules. During state hearings in 1998, for example, automakers said sport utility vehicles should not have to meet the same emissions standards as regular cars.

The scientific arguments against cutting nitrogen oxide emissions may bolster their case.

At the same time, a push to reduce volatile organic compounds could boost efforts to get old cars off the road. Those vehicles are major sources of the chemicals. Gov. Arnold Schwarzenegger's administration has proposed such a program; its plan would cost hundreds of millions of dollars and weigh disproportionately on people who can't afford newer vehicles.

Officials from the California Air Resources Board and the South Coast Air Quality Management District concede that the arguments by Lawson and others cannot be dismissed. But they say that changing successful strategies based on unproven claims would be irresponsible.

"The weekend effect is something you can see in different parts of the country and the world, but people tend to overemphasize it," said Leon J. Dolislager, a state air board official who has researched the phenomenon. "We have to keep our eye on the big picture, not overreact."

In Southern California last year, 68 days exceeded federal ozone standards — nearly twice as many as two years earlier. A disproportionate number of the bad air days over the last five years have been Saturdays and Sundays. In Los Angeles County, 43.5% of the 260 days exceeding a federal ozone standard fell on weekends.

It remains to be seen whether the smog increase is a sign of serious problems or an anomaly caused by unusual weather and massive wildfires, as some air experts have theorized.

Ozone, a colorless and odorless gas, is formed in a photochemical reaction involving nitrogen oxides, carbon monoxide and volatile organic compounds. Laboratory research has shown that altering the ratio of nitrogen oxides to volatile organic compounds in the air can cause more ozone to form. Some scientists theorize that by slashing nitrogen oxide pollution in recent years, state and federal regulators have made the air above Los Angeles more conducive to ozone formation.

Although officials have been cutting both pollutants, they have reduced nitrogen oxides more rapidly over the last decade.

Some experts — most notably Lawson and Eric Fujita of the Desert Research Institute in Nevada, both former California air pollution officials — believe that regulators could keep ozone in check better by slowing the pace of nitrogen oxide reductions while doing more to cut volatile organic compounds.

Over the last quarter century, by drastically reducing both pollutants, regulators have slashed peak ozone levels in the Los Angeles area by 60%, even as population has grown by 50% and traffic nearly doubled. By 2010, environmental regulations will have reduced nitrogen oxide enough that the atmospheric changes seen on weekends will be present all week, Lawson predicts.

"What we are saying is that in 2010, ozone could be worse than it is now; that is the bottom line," he said.

California officials said in a detailed report last year that there might be other explanations for why ozone in urban areas was often worse on weekends.

One theory holds that emissions from weekdays remain aloft and "carry over" to the weekend.

According to another theory, nitrogen oxide emissions from regular cars and trucks, which typically crest during the morning commute on weekdays, peak around noon on weekends. At that hour, the sun is brighter and atmospheric conditions are different, which might cause ozone to form faster.

"There are plausible hypotheses that do not involve the [nitrogen oxide] reduction question," said Richard Corey, head of the California air board's research branch.

State officials, however, increasingly appear to be in the minority. Researchers have found the weekend effect in American cities as diverse as San Francisco, Chicago, Denver and Philadelphia — and many experts say reduced nitrogen oxide appears to be a big reason.

The state officials "are the only ones who seem to believe" that reduced nitrogen oxides are not a leading cause of the weekend effect, said George Wolff, principal scientist for General Motors, who published an article on the phenomenon last year.

Robert Harley, a professor of environmental engineering at UC Berkeley, analyzed 20 years of air-monitoring data throughout California and found that the weekend effect, once seen only in coastal urban areas, could now be observed as far inland as Sacramento and the northern San Joaquin Valley. Like other experts, he concluded that reductions in nitrogen oxides on weekends seemed the most credible explanation for the spike in ozone levels.

"We found the change in diesel truck emissions to be much more important" than the later start time for regular cars on weekends, said Harley, who considered both hypotheses.

California officials remain committed to rapidly cutting nitrogen oxides. In addition to helping cause ozone, they note, nitrogen oxides contribute to another type of pollution: particulate matter, tiny flecks that can become lodged in the lungs and cause serious respiratory problems. Diesel particulate matter is responsible for 70% of the cancer risk from airborne toxic substances in Southern California, according to a government study.

"To address that, we have to do everything possible," said AQMD spokesman Sam Atwood.

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Bad air days

Despite lower levels of emissions, weekend days are more likely to violate federal ozone standards than weekdays in five Southern California counties. In Los Angeles County, for instance, 22% of weekend days exceeded ozone standards over the past five years, versus 11% of weekdays.

Days exceeding ozone standards, 1999-2003

Los Angeles County

Percent of all weekdays: 11%

Percent of all weekend days: 22%

Orange County

Percent of all weekdays: 0.5%

Percent of all weekend days: 3%

Riverside County

Percent of all weekdays: 19%

Percent of all weekend days: 24%

San Bernardino County

Percent of all weekdays: 21%

Percent of all weekend days: 31%

Ventura County

Percent of all weekdays: 6%

Percent of all weekend days: 9%

Source: Calif. Air Resources Board

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