• Last Gasp: A special section of the Fresno Bee

The San Joaquin Valley -- the most prolific farm belt in America -- may be the most dangerous place in the United States to breathe.

Ozone bathes this dusty Valley, corroding people's lungs, reducing crop yields and damaging mature pine trees in the Sierra Nevada. Smog levels spike above the health standard for hours, exposing residents to longer bouts of bad air than anywhere else in the country.

Not even Los Angeles, the nation's smog king for the last half- century, has more violations of the long-term or eight-hour health standard in the last four years.

And that's just the summertime problem.

The Valley is inundated in fall and winter with tiny chemical clusters, called particulate matter, as well as dust and soot, which evade the body's natural defenses and lodge deep inside the lungs.

The Valley is among the worst places in the country for the smallest particulates. Medical experts, who have connected these particles to higher death rates, fear these specks are more dangerous than ozone or smog.

This growing air pollution crisis seems wildly out of kilter in the Valley, which is known primarily for several million acres of verdant fields and cow towns. But Fresno County has the worst childhood asthma rate in the state, and treatment of respiratory illness has become an industry.

The Valley never has had a healthy air year in four decades of regulation. Public officials acknowledge the problems here are far more complex than in the Los Angeles-area's South Coast Air Basin. The Valley's bowl shape and often hot, windless climate create a perfect trap to incubate smog and hold bad air.

Says Michael Kenny, executive officer of the state Air Resources Board, which polices the state's air pollution:

"The topography is terrible. The weather is much hotter. With the growth of population and cars, it's a horrible recipe for the future. It has the potential to be much worse than South Coast."

Geography and climate are not the only hurdles, however. The Valley faces tough federal standards and tight cleanup deadlines at a time when housing subdivisions have become a cash crop.

The population will grow from 3.3 million to more than 4 million in the next decade, a swifter growth rate than almost anywhere in the state. More people, more cars, more pollution.

On top of those challenges, the Valley also must overcome a legacy of government neglect, foot-dragging from industry and unexpected dirty-air sources such as dairies:

State law has exempted agriculture, the $14 billion industry that defines the Valley, from air pollution permit programs for three decades. Federal officials say they will enforce a permit program soon.

Surprisingly, cows are gaining on cars. Gases coming from the waste of the Valley's 2.6 million cows are projected to be the No. 1 source of organic gases that turn into ozone.

Diesel trucks spew pollutants as they cruise Interstate 5 and Highway 99. Though cleaner engines and fuel are on the way, manufacturers knowingly produced 1.3 million engines that emit excess pollution to improve gas mileage and performance on the freeway.

Less than 10% of the cars produce most of the automobile pollution. Yet, regulators have ignored a legislative mandate to test a system that might catch those "gross polluters."

Cleanup plans have been hampered by huge errors in estimates of pollution emissions. Recent evidence shows that air officials underestimated vehicle emissions by half in the late 1980s.

Asthma rates escalated out of all proportion to enrollment gains over the last decade in Fresno Unified School District. Yet, state funding for a $4.5 million asthma study on Fresno-area children didn't get started until just two years ago.

Federal officials admit they didn't pay enough attention to the Valley over the past decade, opening the door for 19 deadlines to lapse on everything from minor rules to major cleanup plans.

Local air authorities and other government officials defend their work, saying the Valley's complex air picture has improved. It just hasn't improved fast enough to meet standards or deadlines.

Officials at the San Joaquin Valley Air Pollution Control District hasten to say they have no control over 60% of the problem -- vehicles, which are regulated by federal and state officials.

They point out that incentive programs and local control of "stationary" sources, such as oil refineries, have made the air cleaner despite a growing population. Their proof: The Valley has fewer violations or "exceedence" days -- when smog spikes for a short time beyond the level where lung damage can begin.

"The number of federal [short-term or one-hour health standard] exceedences has dropped more than 40% since 1989," says planner David Jones of the air district.

But the eight-hour or long-term violations have been fairly static, actually increasing over the last two years. The smog here doesn't hit the one-hour peaks as high or as often as in Los Angeles, but Valley residents spend more eight-hour stretches in unhealthy air.

No matter how you measure the smog, nobody argues that this ugly haze is healthy to breathe.

"We know ozone is an oxidant and toxic to tissue, and the longer you have exposure to toxins the worse the damage is," says Dr. David Pepper, a member of the Fresno-based Medical Alliance for Healthy Air, an advocacy group. "It would not surprise me if studies come out that say we're all going to die years earlier."

What about my lungs?

Breathing is the bottom line.

More than 300,000 people -- 10% of the Valley's population -- are afflicted with chronic breathing disorders. More than 16% of the children living in Fresno County have asthma, a higher rate than any other place in California.

Ask Patty Haury what bad air can do to your life.

Haury, 62, grew up on a dairy farm seven miles outside Visalia. She and her husband, Jim, now grow citrus there.

She wakes up with a sinus headache and a sore throat that don't ease until she sticks her head over a sink of hot water to loosen the congestion. During winter months, the soot in the air even invades her home.

"I have been sitting here with a mask on in my own living room so I can breathe," she says of her cold-weather breathing problems.

Health is a main motivator for Sierra Club member Kevin Hall, who says he wants his 11-year-old son, Joey, to grow up with clean air. When Hall speaks of his favorite air pollution target -- sprawl -- he relates it to health.

"We essentially have a monster on our hands," he says. "And it's called sprawl. Its tentacles are freeways. It exhales smog. It devours open land, lays waste to inner cities, and it kills people."

Health advocates shudder over long-term exposure to acrid-smelling ozone, the main ingredient in smog. They worry over the damage being done to skin, eyes and lungs.

Smog, which has been heavily researched in the last three decades, may not even be the worst threat. New studies show small-particle pollution is connected to high death rates.

The naturally hazy Valley gets soot and particles from fireplaces, farm burning and pollutants reacting with ammonia from dairies.

Diesel particles are the scariest, researchers say. The tiny pieces shot into the air from diesel engines are not only a lung irritant and a trigger for lung conditions, but the state also says they are toxic.

Diesel truck rigs drive thousands of miles daily in the Valley, and hundreds of diesel irrigation pumps run around the clock in summer.

Combine these particles and corrosive smog in this big bowl, and you see why officials fear the Valley is the heir apparent to Los Angeles as the nation's dirtiest air basin.

Faced with this reality, people who have children with lung problems sometimes alter their lives for better breathing air.

Paul Price, 38, a California State University, Fresno psychology professor, drives 45 minutes from his pine-surrounded Oakhurst home to his job on the Valley floor. He does it for his 8-year-old son, Joseph.

The boy's asthma was almost out of control when they lived within a 15-minute drive of the Fresno State campus.

"It literally was every day he would get up and the first thing he would do is sneeze a dozen times and have to blow his nose and cough," Price says.

Since the family moved in April 2001, Joseph is off asthma medication, says his mother, Barbara.

The Prices still miss the convenience and the communal relationships of living close to the university, and the friends they had made since moving to Fresno from Michigan in 1996.

Paul Price says he was not pleased with the idea of moving to Oakhurst, which is just above the Valley's suffocating layers of pollution. But Joseph's deterioration seems to have stopped.

A dusty valley

Dirty air is nothing new in the San Joaquin Valley. Pioneer William Brewer gazed across the Valley in the 19th century and saw haze and dust -- lots and lots of dust.

"Dust fills the air ... It covers everything," Brewer wrote in his journal. "I cannot conceive of a worse place to live."

More than a century of modern civilization has only made things worse. Much worse. And far more complex.

Consider: The smog-forming gases in the Valley amount to less than half the amount in the Los Angeles area. Yet Valley air actually is worse by some measures.

That means there won't be an easy answer, such as simply driving cleaner-running cars or just cleaning up the oil industry. In fact, both of those fixes have been happening for a decade.

"It's not a problem that's going to be solved by concentrating on one area or one industry," says Mario Molina, a Massachusetts Institute of Technology professor who won a 1995 Nobel Prize for research on the ozone layer and now is focusing on ground-level ozone.

That big view is part of two landmark studies, the biggest of their kind anywhere, analyzing smog in a massive swath of California's air. One study focuses on smog or ozone from Redding south to the Mojave Desert, and from the Pacific Ocean to the Sierra Nevada. A second study aims at particulates.

The results of this combined $50 million of research won't be available for another year or more. But this is not a time to sit and wait, say many experts.

The air fight will have to be waged by residents as much as by government and business, experts say, because the little things will count in this Valley. That fight can start anytime.

For instance, residents need to keep the tops closed on all paints and solvents so they don't leak fumes that later will become smog. Such common items send up 24 tons of smog-forming gases daily.

In Los Angeles, the air quality battle already is decades old. Federal and state regulators required Los Angeles to adopt the most stringent pollution controls anywhere in the country since 1990. And they are working.

Compare the Los Angeles area's improvement to the Valley now. You see dramatic differences.

Readings for ozone in Clovis and Parlier often surpass places in Southern California, such as Pico Rivera, Burbank or Reseda. Southern California still has more one-hour or peak violations than the Valley, but Southern California has dramatically improved since the early 1990s.

The Valley's improvements have been lackluster, especially around Fresno, even though many of the pollution control measures developed in Los Angeles are used here.

Why? The Valley is a bowl with many hot, windless summers and stagnant, foggy winters. Many experts believe the Valley is the most accommodating place in the country for air pollution.

At 25,000 square miles, it is the nation's largest air basin, and it has three distinct air pollution seasons -- summer smog, fall dust and winter chemical particles. This pollution damages even mature pines in Sequoia-Kings Canyon National Parks as it rises to the Sierra Nevada.

Within the Valley, the northern counties, San Joaquin, Stanislaus and Merced, are the cleanest, even though they receive the stiffest dose of Bay Area smog blowing in from the west.

Pollution seems to accumulate more in Madera, Fresno and Kings counties, which have far more violations of the federal health standard. And Tulare and Kern counties to the south often suffer the most from stagnant air as the pollution moves to the bottom of the Valley's bowl.

It's not a pretty picture, even compared to Southern California.

"The L.A. basin is pretty well-ventilated compared to the Valley," says atmospheric scientist John Carroll, who has studied the Valley's air for the University of California. "You have a serious problem."

Bureaucratic breakdown

Lung problems and the brown haze are common banter in break rooms and at soccer games. Yet, bureaucrats have heard hardly a peep from the public in the board room.

The public hasn't made a big fuss about the air, so regulators haven't felt a lot of heat to move faster.

Valley air district staff members have been pleading the dirty-air case for years, but their discussions are complex and jargon-laced. The details are all but impenetrable for the public without a steep learning curve.

Big-city environmentalists, who do understand the air-pollution speak, just didn't show up for the conversation.

For years, they have known the technical truth -- that the Valley's air usually ranks right along with Houston or Los Angeles, the nation's worst basins.

But the Sierra Club didn't even mention the Valley in a sweeping 2001 study, "Clearing the Air with Transit Spending," which was critical of places with unsafe air.

Without environmentalists or a grass-roots push, local air officials have struggled in a political Bermuda Triangle. They are caught among powerful industries, the U.S. Environmental Protection Agency and the state Air Resources Board.

Major federal cleanup plans -- detailing goals and deadlines -- have stalled for years.

The local district has passed many rules for cutting down on air pollutants, and thousands of businesses have complied. But the Valley has grown and sprawled, eating up smog reductions from the oil industry and vehicles.

Without the major cleanup plans, environmentalists believe the Valley would continue just spinning its wheels as the population grew.

Environmentalist Hall began learning about this bureaucratic inertia in 1999 when he joined the Sierra Club in Fresno.

In early 2000, he persuaded Earthjustice Legal Defense Fund in San Francisco to investigate the Valley's air problem. Earthjustice found 19 missed deadlines, and lawsuits followed.

"Everywhere we looked in the Valley, we found another problem," says lawyer Bruce Nilles, who was the lead Earthjustice attorney at the time.

The rest of the country has noticed the Valley as well. Many states and districts are waiting to see if the district boldly volunteers for the worst classification of smog polluters, occupied only by the South Coast Air Basin.

Air districts in other parts of the country might make the same shift.

Environmentalists consider the shift another delay because it would extend the smog cleanup deadline from 2005 to 2010. But air district officials say the Valley simply cannot make a 2005 deadline, and failure will be expensive.

Businesses would pay up to $30 million annually in penalties until the air meets health standards. Federal sanctions would hold up funds for more than $2 billion in road projects as well as impose extra fees on new and expanding large businesses. The Valley would then be bumped into the worst category anyway.

Whether the deadline is missed or the district volunteers for the worst smog category, the Valley's image would be further tarnished, some believe. Business and growth might be profoundly stunted in a place where double-digit unemployment already is among the worst in the country.

"I don't think air quality would run off half the new businesses, but bad air quality can be very damaging in attracting businesses," says John Quiring, a former economic development director in Fresno who is now a consultant. "There are so many choices for businesses to locate, why should they waste time on an area that has such poor air quality?"

A history of delays

Missed deadlines and increasing delays in cleanup efforts may land local air in the nation's worst category.

How did the San Joaquin Valley get to the brink of the worst air in the nation?

It took decades of blown deadlines, haggling and miscalculation for the Valley to land at the doorstep of the nation's worst smog category -- now known to the public as "extreme."

But moving into "extreme," which would give the Valley a five-year reprieve on its 2005 smog cleanup deadline, also follows a long-established pattern of cat-and-mouse games between federal, state and Valley officials.

The Valley's last 30 years are littered with accounts of the federal government issuing proposals, edicts and threats to clean up the air, only to accept delays and compromise after meeting resistance. Industries, local elected officials and even state regulators have had a hand in the process.

"When have we ever met a cleanup deadline or had healthy air here?" asks Sierra Club member Kevin Hall of Fresno. "Never."

The U.S. Environmental Protection Agency's history of backing down began in the early 1970s when the agency suggested limiting gasoline sales and cutting back downtown parking 20% in the Valley to encourage mass transit alternatives. The idea was quickly snuffed.

In 1978, federal authorities threatened to cut off $60 million in federal money for Fresno County if the county didn't achieve health standards for ozone pollution in 1982. The county didn't reach the standard, but the EPA never carried out the threat.

County officials told the feds at the time that the ozone standard couldn't be reached by 1982. So an extension to 1987 was granted, as long as the county came up with a vehicle inspection program.

Vehicle inspection came to the Valley and Fresno County, but compliance with federal air standards didn't. The federal government set new standards and deadlines in the 1990 update of the Clean Air Act -- and the Valley would later miss the major targets.

And so it has gone. EPA and backpedaling became almost synonymous.

Environmentalists say the Valley air district also has buckled in the face of political flak, especially from industries.

In the early 1990s, the district backed away from a controversial proposal for mandatory no-burn days for home fireplaces during bad-air episodes in winter. Similarly, after builders complained, the district scuttled an idea to charge developer fees for each ton of smog created by people driving from new subdivisions.

In 1993, the local air district bowed to opposition and decided against forcing major Valley businesses to promote traffic-reducing measures such as car pooling and use of mass transit.

"Some people showed up and objected, so [the air district board] said, 'OK, we won't do it,' " Sierra Club official George Whitmore said at the time. "That, to me, is an example of a governmental breakdown."

The state has played a role in the delay as well. The state Air Resources Board was told in the early 1990s that estimates of vehicle pollution emissions probably were coming up short in California, but the board took no action for years.

The result: Valley regulators for years couldn't know that they needed even more reductions to meet air standards.

Today, local air officials list the 1990 estimate for one pollutant, oxides of nitrogen, as being almost 50% higher than the estimate that was published in 1990. In explanation, they call it "backcasting."

Such emission estimates are constantly changing as research develops better information. But in this case, the state simply decided the research wasn't conclusive enough.

The issue arose in the late 1980s when experts at several institutions tested the state's estimates by setting up pollution monitors at the entrances and exits of highway tunnels and measuring emissions. These were called "tunnel studies."

When they compared their findings with the state's estimates, their readings were considerably higher.

Though state officials initially dismissed the tunnel studies as using "new and unproved" methods, they repeatedly revised their estimates in the following years, each time coming closer to the results of the tunnel studies.

But the state plays a much broader role in air quality than simply providing emissions estimates. California has tough air laws and standards, but it generally does not have firm consequences for missing the mark.

The EPA has the teeth -- in the form of financial sanctions on areas out of compliance with the Clean Air Act. Historically, the sanctions have been avoided, though the EPA is enforcing more and more sanctions around the country as environmentalists push lawsuits and the letter of the law.

Federal financial sanctions anger some San Joaquin Valley Air Pollution Control District board members, who complain the federal government has control over 60% of the problem -- gasoline- and diesel-powered vehicles.

The EPA sets standards for engines and fuel, while the San Joaquin Valley Air Pollution Control District handles so-called "stationary" sources, such as refineries, power plants and businesses. Valley air officials say that even if half the industries were shut down, the Valley would not achieve the federal standard.

Yet the air board and the Valley will have to pay the price in increased fees and, perhaps, the loss of federal road-building money if the air doesn't get cleaner.

"It's not fair," says Valley air board member Jack Sieglock, a San Joaquin County supervisor.

Federal officials try to satisfy as many local concerns as possible without sanctions, EPA officials say. But, at some point, the federal Clean Air Act begins a "sanctions clock" when deadlines are missed. Environmentalists file lawsuits based on sections of the Clean Air Act.

"The sanctions are a matter of law, not discretion," says EPA spokeswoman Lisa Fasano.

Eighteen months after the clock starts, businesses will pay higher fees to expand or to locate in the area. Twenty-four months after the clock starts, the federal government will hold up funding for road projects to slow down growth.

In the Valley, about $2.2 billion in projects would be jeopardized by a missed smog deadline.

Along with the road money freeze, federal officials are obligated simultaneously to start their own plan to clean the air. In Los Angeles 12 years ago, a Draconian federal plan was proposed to include gasoline rationing and no-drive days.

EPA never enforced the plan. After four years of battling and acrimony, the agency softened its stand, matching many of the ideas established by anxious state and local officials in the Los Angeles area, the only place in the country designated as being in "extreme noncompliance with the federal ozone standard."

Which brings us back to the Valley's "extreme" situation.

A similar, L.A.-like battle probably will begin in the Valley by mid-2004 if the local district cannot meet the 2005 cleanup deadline for the current designation of "severe" noncompliance with the standard. By most accounts, the Valley has little chance of reaching it.

Why? Major reductions in car and truck emissions -- the ones the Valley district has no control over -- are coming after 2005. They would represent more than 30% of the reductions the Valley needs.

The vehicle changes won't happen soon enough because they are geared to meet the 2010 cleanup deadline for the Los Angeles area. If the Valley joins the extreme category with Los Angeles, it also will get the 2010 deadline.

The Valley would again sidestep onerous sanctions.

David Crow, the Valley's air pollution control officer, says the air cleanup will proceed at top speed whether the district is classified as severe or extreme. But he says the 2010 deadline gives the Valley a fighting chance.

Many businesses and farmers agree.

On the other side, environmentalists see another in a long line of delays. The Valley's largest city, Fresno, sided with environmentalists in June. The Fresno City Council wants to keep the 2005 deadline and the sense of urgency.

Said council President Henry Perea: "We have to hold our own feet to the fire."

'Worst' designation could hurt the Valley

The extreme designation is a liability that some say could cost the Valley much-needed jobs.

If the San Joaquin Valley dropped into the worst category for air offenders, would new businesses find Central California less attractive and stay away?

"Yes, it would definitely be a liability to have that tagline," says Dave Spaur, president and chief executive officer of the Economic Development Corp. serving Fresno County. "How many projects would we lose?"

That's a tough question to answer. But demand for such details grows each month -- particularly in San Joaquin, Stanislaus and Merced counties -- as the governing board of the San Joaquin Valley Air Pollution Control District considers volunteering for "extreme noncompliance of the federal ozone standard."

The district began studying the idea in late 2001 as a way to sidestep millions in federal sanctions, business penalties and a delay in $2 billion of road-building funds. The designation also would gain the district five years to meet the healthy-air standard.

The downside: A few hundred of the Valley's larger businesses would be forced to enter a federal permit program, and they could pay hundreds or even thousands more each year for paperwork, inspections, monitoring and other expenses.

Experts who help businesses locate around the country say the Valley would have problems if business costs increase -- no matter what the cause.

John Boyd, owner of The Boyd Co. in Princeton, N.J., a worldwide location counselor for decades, says companies are interested in cutting operating costs.

"The quality of life issues have taken a back seat in this economy," he says. "One of the advantages of Fresno is that business costs are lower. If you cause a company to invest more in environmental controls, it may be a difficult challenge to overcome."

In the 25,000-square-mile Valley, those words bite the hardest in the northern three counties, San Joaquin, Stanislaus and Merced. Officials and business owners want alternatives to the extreme designation because the northern counties usually have cleaner air than the rest of the Valley.

They don't want their larger businesses paying extra for a federal permit program. Under the "extreme" designation, the definition of a major pollution source would drop from 25 tons a year to 10 tons a year, meaning more businesses would be considered large polluters.

An estimated 150 businesses would have to join a federal permit program at an initial cost of $5,000. The businesses could include small power plants, manufacturers and possibly even large hospitals.

But that is not the only complaint. Officials in San Joaquin County say it just doesn't seem right to lump their region in the extreme designation, which currently applies only to the Los Angeles area's South Coast Air Basin.

They fear business owners won't come to Stockton or Modesto because they think the air is as dirty as in Fresno or Bakersfield.

"We want clean air for the whole Valley," says San Joaquin County Supervisor Jack Sieglock, who also is on the air district board. "But there is a cost to the stigma of having that [extreme] designation. Our air in San Joaquin County is cleaner than other parts of the district."

In 2001, San Joaquin, Stanislaus and Merced counties didn't violate the one-hour federal ozone standard, a level at which lung damage can begin. Madera, Fresno and Kings counties had 17 violations, and Kern and Tulare counties also combined for 17 violations.

San Joaquin County officials this summer studied several options, including separating from the Valley district. But secessionist talk has died down, and people are thinking about just moving the three northern counties into a separate planning area within the Valley district.

Such a planning area still would abide by district rules, except it would not be subject to the extreme designation. The Sacramento Valley and the Los Angeles area's South Coast Air Basin have similar divisions in their areas, officials said.

But it would be a tough sell to the rest of the Valley, says Andy Chesley, deputy executive director of the San Joaquin County Council of Governments, which is researching the idea.

"You can't just do it because you don't like the extreme designation," he says. "The process is rigorous. We have to show compelling reasons.

"We have smaller counties. We have more commuting. The southern part of the Valley has different problems. We have a responsibility to find out what the differences are."

Smoggiest in the state

Daily ozone peaks in Clovis make it one of California's leading hot spots.

For 40 years, the San Joaquin Valley has struggled to control its smog. But for 40 years, it always could say, "At least we're not as bad as L.A."

Not anymore.

Our air may never become as bad as theirs once was. But right now, in many ways, ours is worse than theirs.

The reason? During the 1990s, as Southern California's air grew dramatically cleaner, the Valley's remained about the same -- or grew smoggier.

This is a tale of two cities.

Azusa lies in the San Gabriel Valley northeast of downtown Los Angeles, where coastal breezes sweep the emissions of a megalopolis into a steep mountain range and sunshine cooks them into ozone.

Clovis lies northeast of Fresno's vehicle-dominated sprawl. Prevailing winds swirl the urban area's emissions over the flatlands abutting the Sierra foothills, where they, too, undergo a sun-driven transformation.

As the 1990s began, Azusa held a firm grip on its dubious distinction as one of the nation's smoggiest places. Its average daily one-hour ozone peak in summer 1991 was a choking 112 parts per billion. On many days, readings exceeded 120 ppb, the one-hour federal health standard.

" Air.Back then, the daily ozone peak in Clovis was far lower, averaging 75 ppb. But levels in Azusa were beginning to drop. In Clovis, they were rising -- and they haven't stopped.

Sometime in the mid-1990s, the two cities switched places. And since, Clovis has had higher average ozone readings than Azusa. Clovis still isn't as bad as Azusa in 1991, but it's growing worse, and it has become one of California's leading ozone hot spots.

This past summer, Clovis had an average daily one-hour ozone peak of 81 ppb; Azusa had 69 ppb. The same is true for eight-hour ozone readings, which measure longer-term health risks. Clovis averaged 70 ppb; Azusa had 53 ppb. Ozone levels in Azusa exceeded 120 ppb on seven days this summer; in Clovis, they passed that mark on 14 days.

Don't blame San Francisco

Evidence fails to support the popular belief that most of the Valley's smog comes from the Bay Area and is the key to our dirty air.

You hear the myth on the farm, in the coffee shop, at the mall: All or most of the San Joaquin Valley's smog blows in from the San Francisco Bay Area.

It's just not so.

Experts on both sides of the Coastal Range agree the Bay Area's smog is not the key to the Valley's dirty-air problems. It never has been.

The argument between Bay Area and Valley air pollution enforcers always has been about whether a "significant" amount of smog blows into the Valley. Can it nudge Valley air to an unhealthful level of smog and cause a violation of federal law?

Valley officials say it is possible, adding that the Bay Area wind blows pollution into the Valley, which then is responsible for cleaning up the mess. Bay Area officials say there is not enough evidence to show that smog from the San Francisco area is causing air violations in the Valley.

The debate was on the front burner again this year with both the San Joaquin and Sacramento valleys suing the state over smog floating into the Central Valley. Gov. Davis in late September made the lawsuits unnecessary by signing a measure requiring the more stringent vehicle review program, called Smog Check II, in the Bay Area.

The Bay Area, already very close to attaining the federal standard for ozone, was the only major metropolitan area in the state that did not have the tougher vehicle inspections. Officials now believe Bay Area pollutants will be cut back by more than 20 tons a day.

San Joaquin Valley Air Pollution Control District officials say that cutback could help the downwind residents in the Valley, though they acknowledge they need a reduction of 300 tons a day to achieve healthful air.

But will the more stringent smog program in the Bay Area really make a difference in the Valley? Terri Lee, spokeswoman for the San Francisco Bay Area Air Pollution Control District, says the previous science is uncertain.

The 1990 research shows 27% of the smog in Stockton comes from the Bay Area, 11% in Fresno and 9% in Bakersfield. Nobody really understands if those numbers apply every day or if they really are creating violations in the Valley.

"The study that they're talking about is more than 10 years old," she says. "It was gathered on one bad day in August at the western-most monitoring station in Stockton. Then a [mathematical] model was used to estimate how much Bay Area smog was going throughout the Valley."

Other evidence indicates the Bay Area is not having a big impact every year. In 2001, the Valley's three northernmost counties, San Joaquin, Stanislaus and Merced, had no violations of the federal ozone standard, the level at which lung damage can begin.

Air officials on all sides say they hope multimillion-dollar research, called the Central California Ozone Study, will settle the dispute. Though that study won't be completed until 2005, some results are expected next year.

Meanwhile, it's a mistake to think huge plumes of pollution from the Bay Area float daily into the Valley, say officials at the state Air Resources Board.

Ultimately, the state is responsible for making sure one area's pollution doesn't hurt another area, and the Air Resources Board says the existing research is being misunderstood.

State officials say Bay Area smog may only come into the Valley on a few of the worst days. The Valley has far more problems with homegrown air pollution.

Valley air officials agree on that point. But they argue that in the Air Resources Board's 2001 review of migrating pollution, the Bay Area's wind-blown smog is an "overwhelming" factor on dirty-air days in Stockton, Modesto and Merced.

But Bay Area spokeswoman Lee says the Valley district still is playing a blame game.

"The northern part of the San Joaquin Valley is the cleanest part of the district -- the central and southern parts of the district are the problems," she says. "This is being wildly misconstrued for political purposes to point the finger at the Bay Area for the Valley's air problems."

Predicting pollution

Forecasting bad air is part science, plus a look outside. But when air quality warnings come, they usually trigger protective measures.

Shawn Ferreria is in the hot seat on this blistering day in August. It's up to the air pollution forecaster to tell us whether tomorrow will be a good day or a bad day to breathe.

If Ferreria forecasts a bad-air day, it sets into motion a string of actions: swim lessons and football practices are canceled, school recesses are spent inside stuffy cafeterias.

Ferreria pores over weather reports at his desk in the San Joaquin Valley Air Pollution Control District office on Gettysburg Avenue in central Fresno. He has a 4:30 p.m. deadline this Aug. 8 to release an air-quality forecast. Radio, television and newspapers will use his air-quality prognosis in their weather news.

Key numbers Ferreria looks at to make his forecast: tomorrow's expected high temperature -- 98 degrees -- and this morning's minimum temperature -- 61 degrees; today's temperature at 2,500 feet -- 76 degrees; wind speed -- between 5 mph to 10 mph; and yesterday's eight-hour ozone average -- 82 parts per billion.

From those and other numbers -- and his intuition -- Ferreria predicts an ozone level of 151 on the Air Quality Index, or AQI, which means unhealthy air.

The AQI is a measuring rod of the health danger of five air pollutants: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide and nitrogen dioxide. The higher the AQI number, the greater the pollution and the greater the health danger.

For example, an AQI of below 50 represents good air quality, while an AQI value over 100 means unhealthy air for sensitive groups. An AQI of 151-200 is unhealthy air for everyone; 201-300 is very unhealthy air and more than 300 is considered hazardous.

Forecasting smog levels is part hard science -- meteorologists use weather charts, historical ozone readings and complex computer models. But they don't rely solely on empirical data. Experience and gut feelings play a role.

A meteorologist doesn't make a pollution forecast until one last check: a brisk walk around the block to look at the sky.

"That was one thing in college our professors told us, 'Don't get too stuck behind a computer terminal, because you've also got to stick your head out the window,' " says Ferreria, who joined the air district about a year ago.

Before that final visual check, forecasters study scientific data from a national weather balloon launched each day in Oakland. The balloon collects wind speeds and direction. It also records temperatures as it climbs, allowing a comparison of surface temperatures to those taken at several thousand feet.

A balloon sent up in Fresno measures wind speed and direction. A California Air Resources Board airplane is flown at the same height as the balloons to capture temperatures from different elevations.

Another tool at the forecaster's disposal is called an air profiler. It measures wind speed, direction and temperatures close to the ground, as well as in the atmosphere.

All of this information "gives you a snapshot at different levels in the atmosphere and how the atmosphere is behaving," Ferreria says.

For example, a cooler ground temperature, coupled with hotter temperatures higher in the air, spells pollution trouble in the Valley. Warmer air above the ground acts like a lid, trapping pollutants, such as smog or soot. Add stagnant air, lots of sunshine, car exhaust and, presto -- smog.

Or, as Ferreria explains it: "You have what is called an inversion."

Besides the weather, forecasters look at ozone and particulate readings taken from air pollution monitors at various locations and compare them to historical pollution levels.

A forecaster can watch ozone levels climb hour by hour on what are known as "real time" air pollution monitors at 24 sites in the Valley. Currently, only five monitors provide hourly particulate readings, which adds more guesswork to the wintertime sooty-day forecasts.

So how often are air pollution forecasters wrong?

Over the last smog season, their track record was 81% accurate for days when the AQI was over 150; and 66% for days when the AQI was between 100 and 150.

On Aug. 8, Ferreria's experience and insight, as well as temperatures, wind speed and pollution readings, direct him to forecast unhealthy air for Aug. 9.

He couldn't know this forecast would not only be correct, but would be the first in a string of unhealthy air warnings he would issue in August.

From Aug. 9 through Aug. 17, a thick smog catapulted the Valley into health alerts that forced schools to keep students inside and everyone else to be happy they were indoors.

Smog lurks even up high

The air at night in Sequoia National Park can be worse than that on the streets of Fresno.

GIANT FOREST -- In the neighborhood where 2,000-year-old giant sequoias live in Sequoia National Park, there is no 5 o'clock rush hour. Lines of cars don't jam freeway onramps. There is no freeway.

Yet, even though the major traffic consists of wildlife -- squirrels, porcupines, woodpeckers -- corrosive pollution hangs in the air all night.

"What's wrong with this picture?" Annie Esperanza, a National Park Service air specialist asks, looking at the ozone [smog] reading at an air-monitoring station near majestic Giant Forest. "All we've got is nature here. But we're at 77 parts per billion for ozone."

That reading next to Giant Forest is only 8 ppb from a federal violation of the human health standard.

On this 73-degree August morning, that smog reading is higher than in Parlier, a San Joaquin Valley smog pocket downwind of the 500,000 people in the Fresno-Clovis metropolitan area.

In fact, you might have breathed easier if you had camped in Parlier the previous night. Pollution levels actually remain higher overnight at midelevations such as Giant Forest in the Sierra than they do in Valley cities.

For Esperanza, this puzzle is all too familiar. As one of the few air pollution management specialists at a national park, she monitors Sequoia air that ranks among the worst anywhere in the federal system.

Sequoia-Kings Canyon National Parks are home to the highest of the high Sierra, the largest trees in the world -- and smog as bad as parts of Los Angeles.

The prevailing wind carries smog from cars, trucks, farms, industries and businesses along a main state traffic artery, Highway 99, as well as Fresno, Clovis and Visalia to Sequoia in the rugged southern Sierra Nevada.

The pine-scented air in Sequoia is the worst in the West for smog, just ahead of Joshua Tree National Park, which is downwind of the Los Angeles area.

Nationally, Sequoia's smog is ranked right behind the Great Smoky Mountains and Shenandoah national parks.

None of the other smoggy parks has a tree anywhere near the size of the General Sherman, which stands 275 feet tall and 103 feet in circumference at its base.

But Sequoia's reputation for dirty air may some day approach its fame for giant sequoias.

John Reynolds, Western regional director for the park service, says Sequoia employees have asked for transfers because the ozone irritates their asthma.

"You wouldn't think you would have that kind of a problem in a national park," Reynolds says. "We're working on ways to communicate to people that it might not be a good idea to climb Moro Rock if it's a bad ozone day."

A bad ozone day in a national park may seem like a sad contradiction in terms, but at Sequoia and Kings Canyon, the visitor centers now have signs showing how bad the ozone will be each day.

It's a tough issue for the public to comprehend. The federal government is trying to raise awareness through a push to reduce haze in national parks.

Officials want to clear the haze that often obscures such outdoor treasures as the Great Smoky Mountains in Tennessee or Acadia National Park in Maine.

The Environmental Protection Agency has put together a public awareness campaign about the new rules, which will cut back on coal plant emissions, primarily in the East.

Out West, in Sequoia, Grand Canyon and other places, there also is a considerable haze problem, mostly dust and other particles.

But the real culprit in Sequoia is an invisible gas: ozone. You can see the chemicals, or the so-called precursors of ozone, hanging in the air early in the day. But when the sun bakes the chemicals, they turn into ozone, a gas that damages lungs, crops, pine trees and other living things.

Add a little smoke or dust in the air on a hot day and you get a brown, chemical soup called smog -- still mostly ozone.

Clearing the air of haze may improve the view, and it will make breathing easier in Sequoia. But it probably won't chase away a significant amount of ozone.

"Those [haze] rules won't help ozone issues," Reynolds says.

Sequoia and the surrounding Sierra are suffering from ozone, experts say. The gas corrodes an elegant Sequoia ecosystem, weakening two types of pine trees and possibly undermining giant sequoia seedlings.

Sequoia isn't the only Sierra mountain haven where it happens. Ozone-related damage to vegetation has been recorded all along the Central and Southern Sierra, including venerated Yosemite National Park.

But Sequoia seems to suffer the most.

In 1998, Sequoia violated the eight-hour federal ozone standard 30 times at the Lookout Point monitoring station. In traffic-clogged Fresno, one monitoring station registered 41 violations of the eight-hour standard that summer.

Cities actually have an advantage over the mountains. In a twist of atmospheric chemistry, ozone levels drop throughout the night in Fresno and any other city where traffic continues all night long.

Why? The same chemicals that turn into ozone in the sunlight also will scavenge and destroy ozone at night. So, ozone can drop to zero where some traffic continues most of the night.

Not so in Sequoia and other mountain destinations where traffic dies off before sundown. Unless there is a stiff evening breeze, the average smog level at night around campers and pine trees generally can remain higher than it does in a metropolitan area because there are no additional chemicals to attack the ozone.

That is the major reason why Esperanza's smog station recorded 77 ppb of ozone at 10 a.m. with virtually no traffic in sight.

Violations occur at 85 ppb over an eight-hour period. That's beyond the federal health standard for humans, although there is evidence that lung problems can begin at lower levels.

When ozone reaches a level of 60 ppb, scientists generally agree that plant damage can occur. (To understand the scale of the pollution, 1 ppb is equivalent to about 1 drop in a backyard swimming pool.)

Lodgepole and Jeffrey pine trees begin showing yellow spots on the needles, which become more fragile and fall out sooner than they should.

The mature giant sequoias -- which can live 2,000 to 3,000 years -- do not yet show signs of damage from ozone, according to scientists. But sequoia seedlings, the next generation of giants, show damage in tests that researchers have performed.

The effects are pretty obvious. Ozone stops the movement of sugar in the plant, inhibits photosynthesis (the plant process of making its own nutrition) and bleaches out the vegetation in spots.

"You'll see this chlorotic mottling," says plant pathologist Mark Fenn of the U.S. Forest Service's Pacific Southwest Research Center in Riverside.

Fenn has studied air pollution effects on plants for many years in Southern California mountains. Being downwind of the Los Angeles area, the mountains have been hit with some of the country's highest ozone levels for decades.

Trees become more vulnerable when insect infestations or other challenges occur. Plant scientists say many trees die from these other challenges, even though ozone damage often makes them more susceptible.

Fenn has been closely looking at the effects from nitrogen, another ingredient in the air pollution puzzle.

Nitrogen, a gaseous chemical element, is ubiquitous in living things. It forms almost 80% of the atmosphere. But it could threaten animal and human life if too much enters the natural system.

Scientists are worried about oxides of nitrogen, which pass from combustion sources, such as cars, diesel engines and other activities.

Researchers know nitrogen is being overloaded in the mountain ecosystem, says Fenn. Nitrogen generally acts as a fertilizer and helps plants grow -- it's found abundantly in manure, which is used as a plant nutrient.

Esperanza says scientists are worried about nitrogen causing too much growth at the wrong time of year. And the wrong plants could be growing too well.

Fast-growing plants, inadvertently or intentionally introduced into the Sierra from other parts of the world, have the potential to eliminate natural species and compromise the overall health of the forest.

"The invasive plants can grow better because of the increased nitrogen," she says. "Often they have developed in places where nitrogen is more plentiful."

There also is concern about the chemistry and biology in lakes around the Sierra. Rainfall tainted with smog can contain acid or sulfur that accumulates in bodies of water.

Scientists believe some of the most pristine lakes in the high Sierra could turn more acidic and destroy some life in the ecosystem. Perhaps ozone is even contributing to the mysterious decline in Sierra frogs and toads, though research does not yet support that conclusion.

Traffic reduction would seem to be among the answers, officials said. Sequoia-Kings Canyon, side-by-side parks in the southern Sierra, attract about 1.7 million visitors annually, but traffic is not the same problem as it is with their more famous northern neighbor, Yosemite.

In Yosemite, officials acknowledge that part of the ozone problem comes from vehicles in Yosemite Valley, which is traveled by about 70% of the 3.5 million visitors annually.

But ozone from cities also drifts into the area through mountain passes. A regional cleanup of the air is necessary, says Yosemite planner Russell Galipeau.

"For us to clean up the air, we need to be a player in the regional discussions," Galipeau says. "We need to reduce our emphasis on the car and support regional transportation."

Asthma steals joys of childhood

Disease means painful attacks, long trips to the hospital and missed activities for children whose lungs swell and tighten when they try to breathe.

Kerry Adaway-Williams slumps over a bowl of beef soup, too tired to stir the steaming broth.

A gurgling cough, followed by another and another seizes the 12-year-old Fresno boy. He wraps his arms around his stomach, rocks back and forth and moans:

"It feels like someone is crushing the sides of me."

Coughing is a signal that Kerry's lungs are irritated and he is on the verge of an asthma attack.

It's a familiar sound in the San Joaquin Valley.

More students carry asthma inhalers to school than take Ritalin tablets for hyperactivity and attention-deficit disorders. Fresno County has the highest rate of childhood asthma in the state. One of six children has the lung disease that makes them wheeze, according to a statewide health survey released in May.

Almost 16% of third- and sixth-grade students in Parlier and Selma show signs of asthma, based on answers to a health questionnaire administered earlier this year. School nurses in Clovis estimate rates are close to 15% in their schools.

No one knows why childhood asthma is so prevalent in the Valley. Less than 10% of children statewide are asthmatics. Nationally, the figure is 5.5% -- a third the childhood asthma rate of Fresno County. Poverty and lack of access to health care could skew the Valley's numbers upward.

But researchers speculate there is another factor: dirty air.

Ozone irritates lungs. So do particulates -- tiny bits of soot, vapors, metals and dust. The Valley has some of the highest levels of these pollutants in the country.

Health officials cite the number of children with asthma in the Valley when advocating for stricter pollution controls.

"We find a strong relationship between high ozone and particulate levels and acute illness," says Kevin Hamilton, a respiratory therapist and asthma educator who is a member of the Fresno-based Medical Alliance for Healthy Air.

"Every year it seems to be getting worse and worse. I'm really worried about this. This is not a good trend," he says.

Last year, doctors at Children's Hospital Central California admitted more than 800 children for asthma treatment and saw about 11,000 in its emergency room and clinics. Asthma was the third most common reason children were brought to the emergency room, behind upper respiratory infections and stomachaches.

Parents blame exhaust from cars, sooty grit from diesel engines, dust from farming and fireplace smoke, along with irritants such as pollen, cigarette smoke and animal dander for triggering children's asthma attacks.

Kerry's mother, Kimberly Williams, says: "The air has 110% to do with his asthma. If I could, I would put him in a bubble all summer."

Asthma attacks can lead to late-night emergency room visits and expensive doctor bills. Families often set up an entire support structure to deal with a disease that takes an enormous amount of resources.

In Kerry's case, logistics fall to his mother and his grandmother, Lucille Williams. Kerry lives with his grandparents on weekdays because his mother works nights at a residential-care home. He lives with his single mother and 3-year-old half brother on weekends.

Mother and grandmother share the duties of taking Kerry to doctor's appointments, sitting by his bedside when he is in the hospital and picking him up at school when he is sick.

Each time he wheezes, they worry. Kerry has been admitted to the hospital six times in the past 10 years with asthma attacks.

'...my heart is on fire'

In her northeast Fresno kitchen, Lucille Williams listens to her grandson's hacking cough. She fears Kerry has pneumonia. It wouldn't be the first time an asthma attack had progressed to a lung infection.

Kerry has a 3:45 p.m. doctor's appointment on this day in May. Lucille Williams lets him sleep until 1:30 p.m., when she insists he throw a robe over his T-shirt and boxer shorts and come into the kitchen for lunch. He shuffles out of his bedroom, eyes drooping and robe belt dragging the floor.

Kerry barely tastes the soup congealing in the bowl in front of him. His grandmother slices an orange. She hopes the fruit will entice him to eat.

Kerry sucks on the piece of orange. Coughs. Swallows. Coughs.

An asthma attack feels "like my heart is on fire every time I try to breathe," he says.

During an asthma attack, Kerry's airways swell and tighten. Think of it as a clogged drain: air trying to get into his lungs backs up, as the carbon dioxide that needs to get out can't escape through swollen and congested air passages. The effort Kerry must expend to breathe can be equated to sucking air through a straw -- with his nose clamped shut -- while running on a treadmill.

Kerry's lungs are primed and cocked, like a gun ready to be fired. Exposure to any foreign irritant can pull the trigger.

Having asthma makes Kerry more vulnerable on hot, smoggy days or on cold, still mornings when wood smoke hangs like a soggy, wool blanket over the Valley.

But Kerry's friends, who don't have respiratory problems, also are at risk from ozone and particulates. Pound for pound, they inhale more air than adults. They're exposed to more pollutants because they spend more time outdoors than most adults, and their developing lungs are more sensitive to ozone, dust and soot.

Trips to the hospital

By late afternoon, Kerry is in the doctor's office and on the verge of a full-blown asthma attack. Beads of sweat pop up on his forehead. His cheeks are red. His eyes swim beneath a glassy film, shimmering in the glare of fluorescent lights.

"How are you feeling, now?" Kimberly Williams asks, leaning close to Kerry, who sits doubled over in the doctor's waiting room.

"My chest hurts," he says, between barking coughs.

Kerry's mother sighs. His lungs may be so inflamed and clogged, he will need to spend the night in the hospital.

She is thinking about October 2001, when Kerry had a severe asthma attack. Doctors at Children's Hospital struggled to stabilize his breathing.

Kerry winces at mention of going to the hospital. He doesn't want to miss a Pinedale Elementary School day at Grizzlies' stadium.

He slouches deeper into the plastic chair.

Fresno pediatrician Razia Sheikh thumps Kerry's back with the heel of her hand, listening through a stethoscope. Sheikh hears wheezing, an indication Kerry's lungs are not letting air flow easily in or out. Kerry's airways are having an asthmatic response.

Bands of muscles are squeezing Kerry's airways. The pressure blocks air from reaching millions of tiny air sacs in his lungs, where oxygen is exchanged for carbon dioxide through cell walls.

Kerry coughs, trying to dislodge a sticky wall of mucus that completes the blockade inside his airways.

If Kerry's lungs don't respond to medication, the doctor warns: "He may end up going to the emergency room."

No one but the mother of an asthmatic can understand what that means, says Kimberly Williams. "You're in a waiting room; you've been there for hours, your child's head against your shoulder. He can't breathe; it's midnight and you have to be at work ..."

Kerry starts to moan.

"I missed a history test," he mumbles, catching his breath between explosive coughs.

The Pinedale Elementary sixth-grader has a 3.5 grade-point average. He doesn't like missing school, where he is a student body officer. But he will miss 11 days of classes by the end of the 2001-02 school year.

Missed school days

Children who are exposed to smog are more likely to get colds, flu and other respiratory infections and have more severe allergy symptoms, research indicates.

School absences are more common on smoggy days or a few days after a smog alert.

In one study of 2,081 California students in the fourth through 12th grades, respiratory-related school absences jumped 83% when ozone levels increased.

Living within 550 feet of heavily traveled roads, where exhaust levels are high, increased doctor visits for children with asthma by as much as 21/2 times that of children living on less-congested streets, according to a California Department of Health Services study in San Diego.

Asthma is the No. 1 reason for school absenteeism at Fresno Unified schools. Children identified as having asthma increased almost 200% in the past dozen years, far outpacing the growth in enrollment during that same time.

Fresno Unified School Superintendent Santiago Wood points a finger at the air for causing most of the 2,000 average daily absences in his 81,000-student district.

Wood himself wheezes from severe allergies and suffers from recurring sinus infections that he believes are connected to local air quality. Last year, for health reasons, he contemplated leaving the Valley and his job at the helm of the state's fourth-largest school district. He decided to stay after trying alternative medicine that eased his symptoms.

Last month, however, the superintendent's health problems returned, and Wood says he can't rule out a move based on medical necessity. "I don't want to sound and appear to be negative, but certainly we've got to keep all our options open."

Across the Valley, school nurses count the increase in asthmatics by the number of inhalers locked in medicine cabinets.

Becky Bartsch had more children at Cole and Red Bank elementary schools in Clovis with inhalers this past school year than she ever had seen before.

She counts 37 children at Red Bank who need inhalers before they run out to the playground at lunch on a day in May. Many of the children carry the palm-size devices in their pockets or backpacks, but about a dozen choose to keep their inhalers in a drawer in the nurse's office. They come to Bartsch when they need their asthma medicine.

If every child with an inhaler had to come to her office to take medicine, Bartsch says, shaking her head, "it would be out of control."

Asthma has led to tragic consequences at schools in the Valley.

In 1996, a Hanford elementary student left his classroom wheezing and coughing. He collapsed and died while members of the office staff tried to assemble a nebulizer, which opens airways more effectively than an inhaler.

The 11-year-old boy's mother sued. She contended school administrators never told her that a special note from a doctor would have allowed her son to keep a pocket-size inhaler with him.

A jury awarded her $9 million in 1999. The amount was reduced by a judge to $2.23 million and an appellate court upheld the lower amount this May.

At his doctor's appointment, Kerry is admonished to keep with him at all times an inhaler of Proventil, a "rescue" asthma medicine, to stop attacks.

Dr. Sheikh assembles a machine, called a nebulizer, with an aerosol bronchodilator to open Kerry's lungs. Kerry starts the breathing treatment, sucking up the mist through a plastic pipelike device.

The medicine tingles. He gags and coughs.

The doctor tells him to take a break. He sprawls facedown on the examining table. Orange Nike tennis shoes -- size 111/2 -- hang over the edge, looking heavy enough to pull all 5 feet, 6 inches of him over.

Kerry begins to snore.

Kimberly Williams frowns. She prods Kerry to get up and continue the breathing treatment.

Kerry's bronchiole tubes slowly begin to relax and open.

Sheikh sends him home, with a prescription for a steroid to reduce inflammation in his lungs, and a cough syrup.

Kerry sleeps most of the next day, but he is well enough a day later to join his sixth-grade class at the downtown Fresno baseball stadium for the Grizzlies game.

Kerry was diagnosed with asthma at age 21/2. His mother and grandmother thought a lingering cold caused his constant coughing. They had no idea it meant his lungs were overreacting to irritants.

Until he was 7, he couldn't participate in athletic activities because exercise caused him to wheeze.

A new generation of asthma medicines that reduce inflammation and muscle constriction -- AdVair, Singulair, Nasonax -- helps keep Kerry's asthma under control so he can now play outdoor sports.

The medications are a godsend, but no guarantee he won't have asthma attacks.

Medicines are costly

On a sunny spring day, Kerry's grandmother remains on guard watching him play baseball on the Pinedale field.

Kerry was sick two days earlier, and Lucille Williams isn't sure her grandson should be chasing fly balls and grounders. Her eyes are glued on No. 67 in left field. Kerry halfheartedly punches a hand in his mitt; he looks tired.

She has Kerry's "rescue" asthma medicine in her purse, she says, patting the leather bag for reassurance.

Kerry's asthma medications aren't cheap. The palm-size inhaler inside Lucille Williams' handbag costs $120.

If Kerry is sick and taking frequent puffs of the medicine, the inhaler can be empty before the end of the month and has to be refilled.

Kerry keeps inhalers in several places -- his grandmother's and mother's homes, another in his mother's car and he stashes one in his backpack. Medi-Cal pays for two inhalers each month. Kerry's mother and grandmother spend as much as $300 a month out-of-pocket for his other inhalers and other medical expenses.

The importance of carrying an inhaler doesn't always sink in with Kerry. He has lost inhalers under couches and at friends' houses.

"One time in a month," Kimberly Williams says, "he lost all of his medicine and they had to be replaced."

Says Kerry: "Sometimes it's hard for me to accept the fact I'm sick."

When he starts seventh grade in August, Kimberly Williams gives her son a lecture. "You don't take your inhaler and you can die."

Seventh grade presents new challenges for Kerry -- from an algebra class to a budding interest in girls. But it's a sixth-period P.E. class that starts about 2 p.m. that causes special concern. Running around the track is part of the curriculum.

On most days, Kerry comes home after school and goes straight to bed.

"I just want to sleep," Kerry says at the end of a day in early September.

Kerry's mother isn't sure if it's a growth spurt or her son's asthma causing his lethargy. Kerry has sprouted 2 inches in the past four months -- from the 5 feet, 6 inches he measured in May to 5 feet, 8 inches.

Immune systems are one theory

Theories abound about possible causes of childhood asthma. Genetics, indoor and outdoor pollutants and childhood obesity are subjects of study.

A hypothesis, dubbed the "hygiene" theory, contends children's living environments may be too clean. The idea is that children's immune systems don't get the turbo-charge they need from infections early in life to kick their immune systems into gear and protect them from developing chronic diseases.

"We appear to be getting more sensitive, as the environment gets cleaner," says Robert Phalen, director of the Air Pollution Health Effects Laboratory at the University of California at Irvine.

But a growing body of evidence shows children's lungs are affected by ozone and fine particulates.

Children in polluted cities have about a 10% decrease in the growth of their lung capacity. A simple way to explain the injury: children aren't able to blow up a large balloon and they aren't able to blow it up as quickly, says James Gauderman, associate professor at the University of Southern California's Department of Preventive Medicine.

Researchers continue to debate whether the lung damage is long-lasting and whether breathing ozone causes asthma and other chronic lung diseases, but they suspect it does. They know the corrosive gas aggravates the conditions.

A recent study at the University of California at Davis found breathing high concentrations of ozone may permanently change the lungs of young monkeys. The primates exposed to ozone develop fewer branches in their airways, have more air sacs and produce more mucus cells, among other abnormalities.

Whether the same structural damage occurs in children's lungs -- and whether it is irreversible -- remains to be determined, but lung growth in baby humans occurs after birth, as it does in infant monkeys.

Fresno children may provide researchers with more clues about air pollution's toll on the lungs of asthmatics. About 250 children are being enrolled in a five-year, state-sponsored study to identify health effects of breathing ozone and particulates.

Thus far, only one study links smog to the development of childhood asthma. The Children's Health Study, a massive undertaking to follow children in 12 Southern California communities, found that youngsters living in smoggy cities and who participate in three or more vigorous sports are three times as likely to get asthma as their sedentary counterparts living in cleaner cities.

Children with no history of asthma were followed from 1993 to 1998. Those who played high-activity sports, such as football, tennis and soccer, in smoggy cities had the greatest likelihood of developing asthma.

Living day to day

When seventh grade starts, Kerry wants to play football. Kastner Intermediate coaches ask the 210-pounder about joining the team.

But Kerry's mother dissuades him.

"I'm just so scared about his asthma," she says.

She doesn't want Kerry breathing hard on smoggy afternoons, when football practices and games are scheduled.

Kerry misses a day of school in early September that his mother blames on the dirty air. "I know for a fact it was the air," Kimberly Williams says.

Kerry can't pinpoint what makes him sick. He just wakes up unable to take a deep breath.

His mom possesses a sixth sense about his asthma attacks.

Kimberly Williams can tell by the look of the sky and the feel of the air if it's a bad day for Kerry to be outside. She also watches weather, pollen and air-quality reports to check conditions.

Except to go to school, Kerry stays indoors on bad-air days.

Sept. 13 is one of those choking, smoggy days that makes Kerry's mother worry. Television weather forecasters advise people to stay inside. Kimberly Williams hesitates about sending Kerry to Kastner.

She suspects he will be sick before the school day ends. But Kerry's physical education teacher keeps his class inside, away from the smog. Kerry doesn't need to leave school early; he's not wheezing or complaining about being out of breath when he gets home.

It's a reprieve. For now.

Kimberly Williams fears there will be asthma attacks and hospital visits to come as tule fog -- and the sooty particles it soaks up -- hovers over the Valley:

"I just think the winter is going to be really bad."

Smog alerts disrupt schools

On one Friday afternoon, football games were called off. Usually, children are kept indoors on bad-air days.

On hot, smoggy days this summer, principals and coaches ushered children into cafeterias and gyms to protect them from the air.

A string of 11 hazardous, bad-air days was the longest in the San Joaquin Valley since 1998, when air officials designated 14 unsafe days for children to play outside. Only Los Angeles -- with 18 health advisories -- had more health warnings this year.

When ozone levels reach 145 parts per billion for an hour, the San Joaquin Valley Air Pollution Control District issues a health advisory and notifies school officials to cancel outdoor recesses and sporting events.

State-ordered health advisories affect everything from after-school swimming classes to tennis practice, but for the first time in recent memory, deteriorating air quality interrupted Friday night football in the Valley. Junior varsity games from Fresno to Parlier and as far south as the foothills outside Bakersfield were called off Sept. 13.

"We've had practices postponed," says Clovis West coach Carl Scudder. "But we've never had a game canceled or postponed or affected by air quality."

The players were disappointed, but safety comes first, Scudder says: "In addition to the kids I'm coaching, I also have two kids I'm raising. And the [air pollution] problem doesn't seem to be getting better; it seems to be getting worse."

A health advisory is different from the air district's "Spare the Air Day" program. On "Spare the Air" days, schools can opt to keep children inside -- but it's not mandatory. Health advisories carry the weight of law, though no one checks to ensure schools obey these health orders.

Overall, school officials take the health advisories seriously. But getting the word to principals and coaches in time to protect children remains a problem.

Ozone concentrations climb slowly throughout the day in the Valley. Smog levels usually spike after 3 p.m. By the time air pollution officials declare a health advisory, elementary students are on their way home and high school athletes are on practice fields.

Health advisories go out by fax and e-mail to schools. The air district also alerts radio and television stations and newspapers when conditions are unhealthy. "Short of an air raid alarm, this is the best way to do it," air district spokeswoman Josette Merced Bello said on a health-advisory day in August.

Still, children can be caught outside on smoggy afternoons, as was the case Aug. 13. While girls on the Hoover High School tennis team warmed up at an after-school practice, temperatures soared to 106 degrees and ozone peaked at 147 ppb, high enough to trigger a health advisory.

Tennis players and coaches were unaware of the unhealthy ozone levels until 15 minutes into practice, when Athletic Director Doug Semmen received an e-mail message directing him to bring athletes indoors.

Semmen dashed to the sweaty players, issuing a curt order: "Everybody off the court."

The urgency of getting children indoors during smog episodes is well-documented. Shortness of breath and burning lungs are two immediate health problems. Long-term exposure to ozone can scar lungs and stunt lung development, and may cause asthma in athletic children.

The California Air Resources Board created the ozone health advisory in 1990 to address health concerns. At that time, the board lowered the health notification level from 200 ppb to 145 ppb to protect "young children and healthy adults who exercise vigorously during high-pollution levels."

This year, the state is reviewing ozone standards, including the current health advisory regulation. The review could result in tightening of rules to better protect children, but the findings won't be available until 2003 or 2004.

Stricter ozone standards likely would trigger more health advisories.

Thus far, 11 health advisories in 2002 and 14 in 1998 are the highest number of smog warnings issued in the Valley. Only one advisory was issued in 2001, three in 2000 and none in 1999 and 1997.

Years of double-digit health advisories could become the norm, however, as ozone levels remain static or creep upwards.

The Valley has all the ingredients needed for smog: hot, stagnant summers and plentiful vehicle exhaust. Ozone, the chief ingredient of smog, forms best on hot, calm summer days when the sun cooks chemicals discharged from car and truck tailpipes and other combustion sources.

Sending children to school in August, one of the hottest and smoggiest months, doesn't make sense, say some Fresno parents. Five of this year's 11 health advisories occurred in August. Three advisories occurred in July and three in September.

"The middle of August is hot. It's miserable; it's no environment to learn in. And one of the dangerous things is the triggering of soccer and all the other sports two to three weeks before that," says Fresno parent Wendy Carroll.

Carroll helped collect signatures on a petition in 2000, asking Fresno Unified School District officials to change the start of school from August to September. The petition-drive failed, but Fresno Unified School District officials did add three parents to a committee that decides the school calendar.

"We got very hot and bothered on one hot, August afternoon and decided to go to the school and find out why our kids were starting school so early and starting sports so early," says Carroll.

The parents heard several arguments against a September start date. The hardest position to fight: Children without air-conditioning or evaporative coolers in their homes benefit by being at school in August.

She isn't against helping children who live in poverty, Carroll says.

But she doesn't want to rely on health advisories to protect her child from harmful smog:

"I know it takes a village to raise a child, but I also have to raise my own child."

Why are children more vulnerable to air pollution?

Children breathe more times per minute than an adult. A child breathes about 20 to 30 times per minute while at rest; an adult breathes about 15 times per minute when resting.

Children inhale more pollutants per pound of body weight.

Children are exposed to more air pollution because they spend more time outdoors during high pollution times, playing, walking to and from school.

Children tend to breathe through their mouths, bypassing the filtering system in the nose.

Children's immune systems and lungs are still developing, which makes them more susceptible to the ill effects of pollution.

Children's airways are narrower than adults', which makes it more likely that inflammation caused by an irritant such as air pollution will obstruct the airways.

Asthma leads to double tragedy

A strong-willed Kingsburg mother and daughter, who refused to leave their Valley home to escape the smog, die of asthma.

Stephen VanGorkom heard the familiar, soft humming noise coming from his daughter's bedroom.

A machine produced the unmistakable sound, as it methodically dispensed a medicated mist to help Shannon VanGorkom breathe.

Shannon, 21, and her mother, Betty VanGorkom, 50, of Kingsburg, had lived with asthma for years. Many nights, mother or daughter awakened, choking, gasping -- unable to breathe through swollen air passages.

What caused Shannon's asthma attack this night? A change in the weather, a cold virus? Or was it fine diesel particles from trucks traveling on nearby Highway 99, soot from fireplaces, dust from plowed fields? Any one of these irritants could have been the trigger.

Her source of relief: whiffs of medicine pumped by the machine, called a nebulizer, plugged into an electrical socket by her bed.

Once the medicine soothed her lungs, she could fall into a fitful sleep.

This night of Feb. 17, 2000, seemed no different than dozens of other restless bedtimes in the VanGorkom home.

First severe attack at age 6

As a toddler, barely out of diapers, Shannon developed a chronic cough that worried her parents. They suspected asthma, but doctors treated Shannon for bronchitis for more than a year before a physician diagnosed the lung disease.

"Man, this kid's had asthma for a long time," Stephen VanGorkom remembers the doctor saying.

The VanGorkoms began a merry-go-round of appointments with lung and asthma specialists. They would try anything to help their impish daughter, with her dark, curly hair and round face.

Betty VanGorkom had had three miscarriages before Shannon was born about seven weeks premature on Sept. 30, 1978. A son, Curtis, was born five years later.

Shannon had her first severe asthma attack at age 6. The emergency room doctor in Selma was blunt: "She's either going to make it through the night or she's not."

Stephen VanGorkom stayed all night at the hospital, keeping a vigil at Shannon's bedside. The next morning, Shannon's airways opened -- but the attack left her lungs shell-shocked -- only a hair trigger from the next asthma attack.

Advised to leave Valley

Over the years, doctors advised Shannon to leave the San Joaquin Valley. The reason: air pollution. The pollutants rubbed against the delicate tissue in her lungs like sandpaper.

A doctor told her in 1999 she should move. Shannon said she was staying. The doctor's reply: "Well, it's going to kill you."

Deaths from asthma attacks are rare, but each year about 60 Valley residents -- 600 Californians and more than 5,000 people nationwide -- die of the lung disease.

Stephen VanGorkom, 54, a rural postal route carrier, wanted to move his family to Oakhurst, above the layer of smog that smothers the Valley.

He and Betty had gone to a couple of church retreats in Oakhurst. She felt better there. She could traipse up a hill and not be out of breath. In Kingsburg, she couldn't walk a block without panting.

But he couldn't make her leave Kingsburg. Betty VanGorkom, a hospital secretary, refused to budge, no matter how many times he suggested they live in the mountains. "Stubborn 'ol her. This was home," he said.

Shannon, a teenage image of her mother -- 5 feet tall and chubby -- also dug her heels in, refusing to be uprooted.

Asthma became another bond between mother and daughter. Doctors don't know what causes asthma, but having a parent with the disease is known to increase a child's risk of developing it. Researchers also know that dirty air aggravates asthma, and the Valley has some of the highest asthma rates in the state.

VanGorkom gave up his campaign to move -- but he suspected the dust thrown up from nearby agricultural fields and exhaust belched by trucks and cars barreling down Highway 99 were part of the reason for his wife's and daughter's asthmatic attacks.

"This is not a good area if you have bad lungs," he says. "You can see the air here. If you can see it -- it can't be good to breathe it."

Teen's lungs collapsed

In her teens, Shannon's asthma attacks escalated in frequency and intensity. She learned to medicate herself and expertly use a hand-held inhaler filled with albuterol, a drug that opens the lungs' airways.

She passed out at home at age 14.

"Her lungs just collapsed," Stephen VanGorkom says, trying to recall details blurred by time. "I think we got her to the hospital ... she was real bad."

Four years later, Shannon blacked out again.

An ambulance took her to the emergency room. Her lungs had collapsed.

"She was barely alive when they got her there," her father remembers.

Shannon adapted to the unexpected and frightening asthma attacks, and to the limitations the disease placed on her. She didn't go to school much. One week in a classroom, two weeks out sick. She missed six months of sixth grade when she caught pneumonia.

By age 16 -- too sick to regularly attend high school classes -- she studied at home. A teacher visited a few hours a week. The rest of the time, Shannon cracked the books on her own. She passed the test for a General Equivalency Diploma or GED.

She got a job as a cashier at a Carl's Jr. in Selma.

Someday, she told her family, she wanted to be a history teacher. When she let her imagination run wild, she talked about moving to Chicago to work for the Cubs.

Her fascination with the Cubs mystified her father. Why the Cubs? She wasn't a baseball fan -- just a Cubs fan. Shannon was mum about her reasons. VanGorkom finally settled on a theory: His daughter was enthralled by the ivy-covered Wrigley Field.

And Shannon worshipped former Cubs' first baseman, No. 17, Mark Grace. Shannon's "screen name" in Internet chat-rooms: "Grace17."

A sleepless night

Awakening occasionally on this February night, VanGorkom could hear the rhythmic purring of the nebulizer and Shannon inhaling wafts of medicine.

His daughter had had a sleepless night.

But getting ready for his rural postal route the next morning, Stephen VanGorkom showed little surprise when Shannon appeared in the kitchen, dressed and ready for her morning shift at Carl's Jr.

She had snapped back many times from an asthma attack. The medicine she had taken overnight to control swelling, ease constriction and loosen thick mucus in her lungs gave her relief -- or so he thought.

Then, he heard Shannon wheeze.

Each breath hissed like air being squeezed out of a balloon.

"Stay home," VanGorkom told her, knowing she wouldn't take his advice.

Better to feel lousy at work, she argued. She wanted to make some money and be with her friends at work.

Shannon always showed up at work, says co-worker Teresa Fuentes.

"She would rather go in when she was sick than to stay home," Fuentes says.

At the fast-food restaurant, her co-workers were alarmed. Shannon's face was bright red. She slumped against the cash register, too exhausted by the effort of forcing air into her lungs to stand upright.

They insisted she leave early.

Betty VanGorkom drove Shannon home from the restaurant. Betty's asthma had disappeared in childhood and returned in her 40s. When it progressively got worse, she had to go on disability from her hospital job.

Shannon fell asleep but slept fitfully all afternoon, not waking when brother Curtis came home from high school and her father returned from his postal route about 3 p.m.

As the afternoon wore on, Shannon's breathing became more jagged. Less air escaped with each exhale. She inhaled in desperate gulps, but her lungs refused to let air in.

After two hours of watching Shannon struggle to breathe, Stephen VanGorkom knew it was time to call an ambulance.

Shannon staggered into the living room. VanGorkom caught her as she started to fall.

Shannon had stopped breathing. VanGorkom couldn't wait for the ambulance to arrive with oxygen. He yelled for a pillow to put beneath Shannon's head. He tilted her neck, pinched her nose and breathed into her mouth.

But with each breath of air he gave his daughter, hopes faded. Shannon didn't respond.

"I knew her lungs were gone," he says. "Her lungs were so dead you couldn't even get any air in. They were so collapsed."

By the time emergency room doctors at University Medical Center in Fresno saw Shannon, her lungs were in the clutches of a full-blown asthma attack or "statis asthmaticus."

Air passages blocked

Dr. Victor Fernandez got the call from emergency room workers that Shannon needed to be admitted to the hospital.

Fernandez cannot talk about Shannon because of patient confidentiality, but he explained what happens during asthma attacks.

When a person is having an asthma attack, the bronchiole tubes spasm or constrict, cutting off the air flow, he says. The lung is designed like an upside down tree. The leaves represent the tiny air sacs called alveoli, the main tree trunk is the larynx or throat and all the branches of the tree are the bronchi or air passages.

During an asthma attack, the air passages also swell and mucus spills into the airways.

Not only are the airways squeezed, Fernandez says, they're swelling: "When it swells, it constricts further and there's also secretions that are inside that constrict it more, and when secretions are thick, they form a plug."

The asthmatic can take in a breath easier than blowing one out. Each inhaled breath of air causes more pressure to build inside the lungs. Asthmatics feel like they aren't getting enough air, so they inhale faster.

But the lungs can't expel the bad air -- carbon dioxide. It accumulates in the air sacs. The heart beats faster, trying to get the oxygen it needs. Things start to happen in the tissues and blood. The acid/base balance starts to become unbalanced. The heartbeat becomes irregular, as the heart works harder.

Doctors use drugs to relax the airways and high-dose steroids to stop the domino effect of constriction, swelling and mucus production. They can put a tube down the throat to force air into the lungs. But sometimes the cascade of biological reactions that block the flow of air can't be stopped.

Living on borrowed time

Shannon was dead.

"They just couldn't do anything," says Stephen VanGorkom. Doctors had tried to save Shannon for almost two days before she died on Feb. 19, 2000.

The official cause of death: cardiopulmonary arrest due to severe asthma.

Shannon had been living on borrowed time since her first serious asthma attack 15 years earlier, her father says. "Ever since that first time her lungs collapsed, I knew one of them could get her. It just destroys your heart and everything. I knew that."

And Shannon knew it, too.

She also knew the Valley's smog and particle pollution put her at greater risk of asthma attacks.

A few months before she died, Shannon told a friend she believed there was not much more doctors could do for her. Her father said she had accepted that.

Laboring to breathe

The hum from the nebulizer filled the bedroom.

Betty VanGorkom needed her husband's help to assemble the breathing machine on the sweltering night of Aug. 3, 2000.

Her health, fragile the last 10 years, had crumbled in the five months since her daughter was buried.

VanGorkom settled his wife into bed about 9 p.m.; she fell asleep. Her labored breathing sounded like a wind tunnel throughout the house.

VanGorkom slid into bed and dozed off about 11 p.m.

Betty's scream startled the "bejeebies out of me," he says.

VanGorkom yelled for his son to call the ambulance while he grabbed a syringe of epinephrine -- a form of adrenaline that helps reduce the swelling of the airways to ease breathing -- kept ready for such a severe asthma attack.

"I started getting medicine out for her. Just as I did, she was sitting on the bed ... and she fell. She passed out," he says.

The paramedics loaded her onto a gurney.

Her last words, spoken through a plastic oxygen mask as she was wheeled away in the emergency room: "I love you."

Within hours, Betty was dead.

The swelling, tightness and sticky fluid had formed an impenetrable dam inside her lungs.

'She wouldn't move...'

VanGorkom and his son, Curtis, moved to a duplex in Kingsburg, where dirty dishes and uneaten food go unnoticed by father and son.

VanGorkom gets antsy sitting in the sparsely furnished apartment without his wife to talk to. Some nights he goes bowling after work.

Betty was the homebody, he says. He liked to travel and go bowling. He stayed home to be with her.

He misses Betty. "You get lucky in something in life sometimes," he says of their relationship.

But there also is a shadow of anger behind the warm memories.

"She wouldn't move out of here," VanGorkom says of Betty's steadfast refusal to relocate to a less-polluted environment. "I tried to get her to move, I don't know how many times.

"I told her we'd move up to Oakhurst. The air's just that much better, yet it's still in the area. I could have even kept my old job, I told her: 'I'll drive two hours to and

from if you guys will feel better. It don't matter to me. I just want you guys to feel decent.' "

But he's not really mad at Betty or Shannon. They were two, stubborn strong-willed women, he confides, with a fondness and a tinge of admiration in his voice.

He visits the Kingsburg cemetery, where mother and daughter are buried, about once a month.

"I'm bent," he says, "but I'm hanging in there."

Imprisoned by smog

Fred Fuerte moved to Fresno to be close to his children, but in August he spent eight straight days afraid to leave his home.

Fred Fuerte can tell a bad-air day just by stepping outside his northwest Fresno home. The slightest bump in ozone causes his lungs to spasm and his airways to swell.

Fuerte, 49, describes himself as an "environmental asthmatic." Breathing on a smoggy day in the central San Joaquin Valley, he says, is like "driving with a hand brake up."

Twenty-six times last year, he needed medical help to breathe and had to go to an emergency room in Fresno.

He keeps a syringe loaded with medicine to stop asthma attacks on his kitchen counter, a bag packed at his bedside to take to the emergency room and a canister of oxygen in the corner.

In June 2001, he had to be airlifted from an asthma camp in Yosemite National Park, where he was a volunteer coordinator.

A month later, he spent 12 days in the hospital when his lungs clamped shut.

This July, Fuerte says a string of smoggy days triggered an asthma attack that he couldn't control with the medications he keeps at home.

He called an ambulance after three days of labored breathing.

"Before I called the ambulance, I put myself on oxygen," he says. For this asthma attack, he stayed a week in the hospital.

Fuerte moved to the Valley 18 years ago from his native Hawaii. He was a petroleum engineer before he went on disability at 32. Now he volunteers with the American Lung Association in Fresno to teach asthmatics how to live with their disease.

People ask him why he left Hawaii -- or why he doesn't return. He moved to the Valley to be close to his children.

"But it's not easy to breathe in Fresno," he says. This summer, for eight days in August, he was afraid to go outside because of the smog.

Says Fuerte: "It's just like being in prison."

Dirty air puts everyone at risk

Healthy adults should heed dirty air warnings. Repeated exposure, even in small amounts, can lead to scarring of the lungs.

Children. Elderly. Asthmatics. These "sensitive groups" are advised to limit their time spent outside on smoggy and sooty days.

But healthy adults? Seldom do smog levels climb high enough to dictate a warning for them to seek cover from dirty air.

Are the very young, very old, physically weak the only ones at risk? Are the rest of us pollution proof -- immune to ozone's corrosiveness and the sting of airborne particles?

Hardly, say researchers. We're all at the mercy of the air we breathe.

And healthy adults may be at greater risk from pollutants than they realize. Each day an adult inhales enough air to fill about 5,000 2-liter Pepsi bottles, and the amount of air breathed can increase as much as twentyfold with exercise or exertion.

A healthy adult is foolish to shrug off bad air warnings, says Jean Ospital, health effects officer at the South Coast Air Quality Management District in Los Angeles.

"If you're out in ozone for several hours, even at low levels, you can have respiratory effects," says Ospital. "And the longer you're out exercising in it, the effects can occur at lower and lower levels."

In the San Joaquin Valley, ozone levels tend to climb steadily, reaching peaks that remain elevated for hours.

During ozone season -- between May and October in 2002 -- the Valley exceeded the eight-hour health standard almost two-thirds of the time. Even before and after the season, ozone levels surpassed the standard nine times this year. By November, there were 124 health violations. (Violations of the federal eight-hour health standard begin at 85 parts per billion -- the level at which lung damage is known to occur.)

The short-term effects of breathing ozone at unhealthy levels are well-documented: a tickle in the throat, uncomfortable burning in the lungs and a temporary shortness of breath. Even healthy adults rub stinging eyes and cough on smoggy days.

Ozone's damage to the lining of the lungs usually is temporary. Much like sunburned skin, lung cells shed and are replaced within a day or two with new, healthy cells.

Repeated exposures, however, can lead to scarring of the lungs. Air pollution researchers don't yet know if this scarring causes irreversible damage to the lungs of adults. Breathing the caustic gas can exacerbate illnesses such as emphysema or chronic bronchitis. And there is some speculation that breathing ozone can accelerate the loss of lung function that occurs naturally as part of the

aging process. Lung function is the volume of air you can inhale and the speed at which you can exhale it.

So far, researchers have documented long-lasting lung damage in animals exposed to ozone. They speculate the same could be true for an adult man or woman who breathes smoggy air for a number of years.

There's little question children, the elderly and those with heart and lung problems can experience lingering health problems. That is why smog and soot alerts single them out for notification when pollution levels increase.

"I don't think the average healthy person needs to have great concern, day to day. But should people who may be compromised with heart or lung disease give consideration to what the air quality is? Yes," says Dr. Jonathan Samet, a pulmonary physician and epidemiologist from Johns Hopkins Bloomberg School of Public Health in Baltimore, Md.

Smoking a pack of cigarettes a day is far worse than breathing polluted air. A one-pack-a-day smoker is 22 times more likely to get cancer than a nonsmoker, according to the federal Centers for Disease Control and Prevention.

But another researcher is less convinced adults can breathe easy. He compares breathing polluted air over a period of years to an 18-year-old who starts smoking. There is no early impact, but the risk of heart and lung disease, as well as cancer, increases over time.

"This long-term exposure, day-after-day, month-after-month, year-after-year, is what matters the most," says C. Arden Pope III, a researcher at Brigham Young University in Utah who is studying the effects of particulate pollution. People can stop smoking and change other habits to improve their health, Pope says. Dirty air presents a unique wrinkle: You can't stop breathing. "Certainly, it's not as large a risk factor as poor diet, lack of exercise and smoking, but it's hard to find environmental risk factors that have as much impact over as large a part of our population," Pope says. "Exposure to air pollution is so ubiquitous."

Lucy Vasquez attributes her chronic respiratory problems that developed later in life to breathing polluted air in the San Joaquin Valley for 30 years.

A Fresno school community relations coordinator, Vasquez says she always has been athletic, spending hours outdoors on a tennis court or riding a bicycle.

She is convinced this repeated exposure to pollutants is what caused acute sinus infections that began about 10 years ago. Two years ago, she was diagnosed with asthma.

"It's got to be our air quality that is affecting me," she says.

Familiar wheeze

Respiratory therapist Sandra Beck contracted asthma herself when she moved to the Valley.

The whistling sound is unmistakable.

"It's a definite wheeze," says Sandra Beck. "That's not a sound you make with a cold."

After 24 years as a respiratory therapist in Fresno -- almost a dozen of them as an asthmatic herself -- Beck knows what asthma sounds like. Air being forced through swollen and narrowed airways creates a distinctive squeak.

The high-pitched clattering she hears inside Brandy Jackson's chest is a textbook example.

"You can wheeze and not be an asthmatic," Beck says. "But it's the first reason that comes to our mind."

Brandy, 15, had no symptoms before this day in October -- but two brothers are asthmatic. Having a family member with asthma increases your risk for the disease. What precipitated Brandy's airways to constrict and swell, Beck can't say. Something in the air, however, probably triggered her asthmatic response.

Beck suspects air quality in the San Joaquin Valley is the catalyst for her own asthma. She grew up in Vermont where the air was cleaner. She began showing signs of the lung disease after moving to Fresno in 1975, and was diagnosed as having it in the early 1990s.

"My asthma didn't get triggered until I moved to this area," she says.

Many of her asthmatic patients are sensitive to ozone, smoke and soot. She gets more patient calls on dirty-air days. Beck works for the Community Medical Centers Asthma Education and Management Program in Fresno, teaching people how to live with the lung disease.

Some of her patients leave Fresno because of their breathing problems. She doesn't discourage them; moving has crossed her mind. She takes trips to the Central Coast when she needs a reprieve from air pollution.

Foggy days that hold fireplace smoke close to the ground are the hardest on her lungs. "I don't go out much when it's foggy," she says. "I can feel my little bronchiole tubes twitching."

But dust blowing off plowed fields touched off one of her worst asthma attacks about a year ago.

"I thought if I took my inhaler [of asthma medicine] before I went to an outdoor concert that I would be OK," she says. "It was a bad choice to make."

Beck couldn't breathe and had to be driven home after 30 minutes standing outside to hear jazz guitarist Craig Chaquico at The Bastille in Hanford. She spent the next day in bed. Co-workers scolded her for exposing herself to dust in the air. "But I spent $70 on those tickets," she says.

Her experiences living with asthma make it easier to teach patients.

Beck pulls out a small laminated flip chart from her jacket pocket to show Brandy what airways look like when they are inflamed. The picture of a pink air tube doesn't appear to make an impression. Brandy barely nods.

She shows Brandy how to use an inhaler attached to a spacer, a plastic container about the size of a baby bottle. The spacer helps the medicine in the inhaler get into the lungs instead of on the tongue, explains Beck.

"I put mine [inhaler and spacer] together and shove it under my pillow so I can just pull it out at night," Beck says. "When I can't breathe, it wakes me up.

"I was over 40 when I had my first one [an asthma attack]," she tells Brandy.

An asthma attack "can be terrifying," Beck says. "The terror of, 'What if it happens again?' is very real."

Beck's first attack hit while she drove home from a respiratory-care conference in Napa. She was afraid she would have an accident before reaching the hospital. "I could feel [my lungs] getting tighter and tighter. I was gasp-breathing."

That first attack hit her by surprise. Today, Beck says she should have recognized the warning signs -- a chronic cough and repeated bouts of pneumonia. She ignored them because she was in denial that she could have the disease.

She is sensitive to asthma clues now -- like a dry, hacking cough.

Any time she hears the barklike sound, while shopping or at a social gathering, she investigates. "I will stop [people] right there to ask if they have asthma or if they have been checked for asthma."

She doesn't hesitate to tell asthmatic patients to stay inside on smoggy or foggy days or to tie a scarf around their nose and mouth if they do go outside.

"You have to warn them."

As for herself? She stays indoors.

Agriculture a leading polluter

In the summer, the agriculture industry creates more air pollution than the Valley's eight highest-polluting businesses combined. For decades, farmers have escaped regulation, but times are changing.

A gentle morning breeze carries the distant mooing of cows near green alfalfa fields and rows of cotton that stretch to the western horizon of the San Joaquin Valley.

Sunrise finds farmhands inspecting muddy irrigation ditches that bring clear, cold San Joaquin River water to east-side vineyards and orchards filled with sweet fruit. A pickup cruises slowly on an otherwise deserted road.

The scene could be a poster to entice big-city people away from crowded freeways and industrial air pollution.

But this bucolic landscape is not so sleepy, and the barnyard is not so benign. Air pollution doesn't just come from big cities.

Tons of pollutants come from large, modern agriculture, and farmers have long resisted some of the air pollution controls common for other Valley industries.

Air pollution district figures tell the story:

During summer, the $14 billion agriculture industry creates more lung-searing air pollution than the Valley's eight highest-polluting large businesses combined. These businesses include oil-producer Aera Energy of Bakersfield as well as glass manufacturer Libby Owens Ford Co. in Lathrop.

For one of the two major, smog-making pollutants, reactive organic gases, livestock waste is projected to pass cars in 2005. Farm equipment in 2005 will run second only to heavy-duty diesel trucks for nitrogen oxides, the other major smog ingredient.

Farming accounts for 54% of the particulate matter, far and away the biggest contributor of particle pollution in the Valley.

Yet the Valley's largest industry has followed few air rules for decades.

State law exempted farm field activities from air pollution permits in the early 1970s. Farming has been largely excluded from state air laws since the 1940s.

"It doesn't make sense," says lawyer Brent Newell of the Centers for Race, Poverty and the Environment, which has filed legal action over dairies in several Valley counties since 1998. "It's sinful. Ag is not being regulated because there is a lack of political will."

Until the past year, the exemption seemed bulletproof, creating what environmentalists call a "hands-off" regulatory approach to plowing, discing, harvesting, raising animals and other farming activities.

But the exemption is on the ropes. Federal officials this year have stepped in.

Prompted by an environmental lawsuit, the U.S. Environmental Protection Agency announced that large farms will be required this May to enter a program that is largely an information-gathering exercise to identify pollution sources and track them.

It will give San Joaquin Valley Air Pollution Control District regulators what they need to make rules to control dirty farm diesel engines and dairy emissions, agriculture's biggest air pollution problems.

Normally, the state would run such a permit program. But EPA probably will have to enforce it until the state repeals the exemption that keeps farms out of such programs. State officials have given no indication yet that they will repeal it.

California will pay dearly if the exemption isn't lifted next year, federal officials say. By late 2003, EPA will force new or expanding businesses to pay extra fees. By 2004, the federal government will freeze billions of road-building dollars for California.

Will all this curb farm pollution next year? Probably not.

It could take months or even years to pass rules. The rules must go through the Valley air board, which must go through a process that includes workshops and public comment.

Environmentalists say such rule-making is a political process that can still be influenced by the farming industry.

"We will be watching," says lawyer Newell.

The Valley air district could have written some farm pollution rules years ago, legal experts say. The state exemption only prevents the government from forcing farms into permit programs. Nobody said anything about enforcing a few rules.

Environmentalists say powerful political connections have kept the district rules off the books and information about dirty farm diesel engines, dust and dairy emissions away from the public.

Farmers say the criticisms are unfair. They say research is not conclusive, and one-size-fits-all methods of measuring pollution used around the country would not be suited to the Valley.

Even so, agriculture committed years ago to clean up its air pollution, they say. With the help of a state incentive program, farmers have replaced more than 2,000 dirty diesel engines used for pumping water.

There also are natural benefits to agriculture, farmers argue. Some studies suggest plants can remove a small percentage of pollution from the air.

Millions of trees and vines produce oxygen through photosynthesis, says farmer Paul Betancourt, former president of the Fresno County Farm Bureau.

For example, he says, "It is estimated that one acre of rice scrubs about 23,000 pounds of carbon dioxide from the air, roughly the same amount produced by a typical automobile annually."

Local air officials don't have a detailed analysis of farming's effects, because they have been focused on bigger pollution reductions, from sources such as large industries.

Valley regulators say they need more research, particularly on dairy emissions, which are being studied extensively now.

But, from what regulators know, they estimate that by summer 2005, livestock waste and pesticides will combine for 26.3% of so-called reactive organic gases that turn into smog. That's 117 tons a day in the warm months.

Livestock waste and pesticides would be the top two emissions sources for these gases.

That's enough to launch regulation, environmentalists say. They say that agriculture, like any industry facing higher bills for pollution control, is dragging its feet.

Environmentalists trace farm-air politics to the early 1970s state Health and Safety Code. But, dating back to 1947 when California's first air quality law passed, agriculture has simply not been considered a source of air pollutants.

In the 1970s, after the federal Clean Air Act was passed, the farm exemption was lumped into the state's consolidated air pollution regulations. The law was enacted in 1976.

Farm historians and economists do not know how the obscure exemption came to be, but critics see a coordinated effort to keep it in place.

Harry Foster, chief executive for Family Health Care Network in Tulare County, says agriculture seems untouchable.

Foster, who participated on an air district permit review board a few years ago, believes the air board should have been making noise about farming for years:

"We seem to be looking the other way. The silence is deafening."

Not all of farming is responsible, environmentalists say. It's the larger farms, the ones they call factory farms.

The U.S. Farm Census shows there are 27,489 farms on more than 9.5 million acres of Valley land. More than 80% of the acreage is divided among about 5,000 farms.

Many large farms have grouped older diesel engines to pump water around-the-clock at certain times of the year.

These large operations can easily exceed 25 tons of pollutants a year, which would qualify them for a permit as "large sources" if state law allowed them to be regulated. That would put them in the same category with industries such as petroleum.

Though the state exempts farms from air permit programs, the federal Clean Air Act does allow them to be regulated. Environmentalists say they waited years for EPA to do it.

But EPA balked last fall. Officials explained they needed three more years for study. The National Academy of Sciences brought together two dozen scientists to study farm air emissions, says Amy Zimpfer, deputy director of the air division in the West.

Environmentalists didn't buy the argument. Earthjustice Legal Defense Fund and the Center on Race, Poverty and the Environment filed suit. In short order, EPA agreed to enforce the permit program on farms.

Farm reaction

These environmental lawsuits make farmers and farm lobbyists bristle. They ask where the environmentalists were when the hard work on air quality began 10 years ago.

"For the last decade, agriculture has been helping to make improvements in the air," says lobbyist Manuel Cunha Jr., president of the Nisei Farmers League.

Farmers rarely get the credit they deserve for working on air pollution, says another lobbyist, Roger Isom, vice president of the California Cotton Ginners and Growers Associations.

The cotton-ginning industry is not exempt from air regulation, he says. Food processing and post-harvest activities -- refining, drying, pasteurization, packing and cheese-making -- are regulated under federal law.

"It's not like ag is an industrial source that's going day after day," he says. "It's seasonal. The question is how can we do our share and not be put out of business?

"We want to reduce pollution. I've got a daughter with asthma. I breathe the same air."

Cunha says farmers have been replacing old, polluting diesel engines with newer, cleaner-burning diesels over the past several years. Farmers know smog can cause a 20% to 30% production decline in grapes, cotton, oranges, onions, beans and other crops.

Local air officials confirm farmers have replaced more than half the estimated 3,850 stationary ag pumping engines in the Valley over the last three years. Farmers have received state help through an incentive program, which provides some of the money they need to buy new, cleaner-burning diesel engines.

And the state has required farmers to cut back on pesticides, which contribute 40 tons of smog-forming gases a day to the air in summer. In the last six years, pesticide use has dipped by more than 20%.

Farmers say they have worked on the dust problem, too. They have oiled more than 700 unpaved roads as well as regularly watered other unpaved routes to keep down dust pollution and control insects.

But farmers must pay for oiling unpaved roads and replacing diesel engines. Betancourt, a Kerman-area grower, says many farmers often use older engines to make it through another year in a business that has slumped.

Farmers are concerned about the environment, but finances must be a major part of the decision-making process, he says:

"Some people may have the impression we've been given a big exemption and we're abusing it. For 15 years, I've watered my roads. Sure, it keeps down the dust, but I do it to keep mites off of the crops. We do things that make sense economically and environmentally."

The politics

Agriculture's good sense extends to political connections in Sacramento and Washington, D.C. Farmers have effective lobbyists.

Like representatives from any industry, lobbyists, such as Cunha, make their case privately with lawmakers and bureaucrats.

But in the last 18 months, two public examples of their work surfaced in the Valley.

In March, Michael Kenny, executive officer of the state Air Resources Board, publicly raised the possibility of "no-spray" pesticide days when smog levels are high.

The day The Fresno Bee published the story, officials high in Gov. Davis'. chain of command backed away from the suggestion, and it hasn't been mentioned since.

In fall 2001, a more sustained picture of lobbyist work unfolded when farmers fought a new rule to curb dust in the Valley.

Documents confirmed a lobbyist's contact with a key EPA official just before an agricultural exemption was allowed in the new rule. It was a last-minute move that clearly irritated some members of the Valley air district board.

The district board is charged with the authority to pass such rules. But EPA can reject the rules if federal guidelines are not closely followed.

Knowing federal officials hold power over the final approval, lobbyists from many industries -- construction, manufacturing, farming and others -- will contact EPA to present their concerns.

In the case of the dust rule, farm lobbyists were worried about the Valley air district's approach.

Farmers feared the rule would unreasonably require paperwork, new equipment and new employees. Without changes in the rule, farmers said, the cost for agriculture could climb more than $500 million.

But the air district's estimate was closer to $1.3 million. Many farmers would not be affected, district officials said.

Farm lobbyists complained to a state official, Assembly Member Dean Florez, who called a public meeting. But the meeting had little effect on the district's proposed rule.

Farmers then asked to meet with EPA's regional officials to hammer out a compromise on the rule. With EPA in agreement, they probably would have no problem selling the compromise to the Valley air board.

Environmental and health advocates learned of the meeting and asked to be included. EPA expanded the meeting so the other interest groups could present testimony.

Farm officials were dissatisfied, so they began working behind the scenes higher up the federal pecking order, contacting Sen. Dianne Feinstein's staff.

Feinstein's staff e-mailed the regional EPA office, raising the farmers' concerns and attaching a letter to EPA Administrator Christine Todd Whitman.

"We understand that the air quality issues in the San Joaquin Valley must be addressed, however, the methods proposed by EPA staff may well plunge the agricultural industry in the San Joaquin Valley into further depression without improving the air," the letter concludes.

EPA regional officials confirm they spoke with Feinstein's staff about farm concerns two weeks before the Valley air board voted on the dust rule, but claim the conversation changed nothing.

"Our concern was that they would try to pressure us," says Andrew Steckle, chief of EPA's rule-making office in San Francisco. "But it didn't happen."

Just before the Valley board's vote in mid-November 2001, the farmers and EPA reached a compromise, allowing an exemption for some ag equipment as well as other tweaks.

EPA would not elaborate on how the compromise was reached. But a fax obtained by The Bee through the Freedom of Information Act showed lobbyist Cunha communicated directly with EPA Regional Director Jack Broadbent just two days before the Valley air district vote.

The message simply contained a legal definition of on-field farm equipment such as harvesters: "Implements of husbandry: Any new or used vehicle used exclusively in the conduct of agricultural operations as described in Chapter 1 of Division 16 of the California Vehicle Code."

Cunha explains EPA requested the fax from him as background. He says the issue had been discussed for many months in workshops, and he and EPA did nothing improper, he says:

"It was not anything that was done at the last minute. To me, it was just part of an ongoing conversation."

Two days later, "implements of husbandry" were exempted from the dust rule. Tractors and harvesters could move on unpaved roads between fields without being subject to the regulation.

"Another backroom deal," says lawyer Newell of the Center on Race, Poverty and the Environment.

EPA officials are aware of how the last-minute negotiation looked.

"Could it have been done better?" asks Broadbent. "I'd be the first one to say yes. I've met with farmers, environmentalists and the board to assure them that EPA is committed to working with them."

After the meeting in November, however, several Valley air board members said the farmers made an end-run around local authority. Board members say they had little choice but to accept the compromise because they had run out of time.

The Valley already had been assessed a federal sanction -- increased costs for new or expanding businesses in the Valley -- for missing an October deadline on the rule. Board members didn't want to risk further sanctions.

By approving the rule, they started the process of lifting the federal sanction, which EPA eliminated a few months later.

But board member Barbara Patrick, a Kern County supervisor, says, "Some kind of deal was cut. We can't have that."

Adds veteran board member Bill Sanders, a Tulare County supervisor: "I've never seen anything like that. What does that mean next time?"

Regulation on the way?

A lot of people are working on information that should help the next time.

Research on dairy gases this year will add grist to two other landmark studies costing $50 million. The two studies -- one on smog and one on particle pollution -- are expected to begin producing results in the next few years.

Just over the Tehachapi mountains, farm regulation may also begin soon, but it won't be a political battle. Officials in the Los Angeles-area South Coast Air Quality Management District say their air basin is largely urban with 15.5 million residents. People are not reluctant to regulate the farm industry or any others.

"We used to argue over the goal of cleaning up the air," says executive officer Barry Wallerstein of South Coast. "We all recognize it harms public health."

In the Valley, it's a different story politically. Some on the Valley air district governing board feel strongly about protecting agriculture.

Board member Tony Barba of Kings County says, "If you eliminate jobs, how will the poor survive? How about the people who don't have any lung problems and who are just trying to earn money?"

But many experts believe agriculture does not have the same clout it did three decades ago. The handwriting is on the wall, says Bryan Jenkins, a biological and agricultural engineer at the University of California at Davis.

"It's a question of how much the state wants to subsidize restrictions," he says. "You can place restrictions, but how does agriculture meet them?"

State-permitted ag burning gets Valley fired up

The plumes of smoke from open-field burning or the burning of paper trays from the raisin harvest send many residents to the doctor, but it is the cheapest way for growers to dispose of waste.

One crisp January morning this year, Fresno investment broker Tom Marsella drove south on Highway 99 from Northern California and encountered columns of smoke one after another for more than 100 miles.

It wasn't the first time the 62-year-old Fresno native had seen a frosty, clear morning turn into a long, sooty drive in the San Joaquin Valley.

"I had asthma as a kid," says Marsella. "There's got to be something we can do about this air. I thought it was getting better until I smelled this."

Farm burning touches a nerve with many residents.

Open-field burning of farm prunings, weeds and crop waste anywhere near a major road is hard to miss. People with sensitive lungs complain they know immediately when the burning takes place. Runny noses, persistent coughs, irritated lungs and doctor visits seem to follow.

Over many years, agricultural fires have developed a bad reputation, say San Joaquin Valley Air Pollution Control District officials who hear complaints.

"The chances of smoking out a community if a farmer burns on a no-burn day are quite high, and it happens," says Stephen Shaw, air quality project planner for the district.

So why do the air pollution cops even allow burning? Because the state allows it.

Authorities have historically allowed the burning of crop waste and prunings under a permit program because it's the cheapest way for growers to dispose of the farm and waste wood -- generally called biomass.

The permits also allow farmers to burn the thin paper trays used in drying the raisin harvest.

Compared to driving on unpaed roads and other farming activities, ag burning is not a major source of particulates, according to air district figures. Officials say the soot and ash amount to 3% of the particulate pollution on a daily basis.

That is fewer than 10 tons a day, averaged over a year. For comparison, wood stoves and wood burning in fireplaces put out about 12 tons a day if averaged over a year. The dust from unpaved roads accounts for about 72 tons a day.

But those numbers mean nothing if an open-field ag burn smokes out your home, neighborhood or business.

Much of the burning takes place when the Valley's bowl of air is relatively clean, usually in the late fall and winter, though there is some burning in warm months.

The air district has employees who search for violators on no-burn days. In 2000, they cited 348 illegal burns for a total of $99,000 in penalties.

The average penalty was $285 to $300. An offender can go to a "burn school" -- which provides education, much like traffic school for those who get tickets -- and have a penalty reduced by $150. Thereafter, however, the penalties increase.

The Valley is the largest air district in the country. Eight counties from San Joaquin to Kern cover 25,000 square miles, and sometimes illegal burns are not seen.

The district is divided into three areas -- north, central and south. At times, the air is clear enough for burning around Stockton, but not in the central area around Fresno or the southern area around Bakersfield.

In that case, the northern area burns, but the central and southern do not. So farmers in the central and southern areas pile up their crop wastes and wait for a clear day.

To deal with backlog, the air district is changing the burning regulations to carve the district into about 100 small zones. Burning would be stopped only in the small zones where the air is not good, allowing others to burn.

The backlog can be a problem. In Kern, Tulare, Fresno and Madera counties, the combined total of woody waste -- such as orchard prunings -- is more than 1 million tons annually.

No matter how well burning is managed or how much money it saves, some people want it stopped.

Dwayne Burk of Fresno wrote The Bee in January:

"It makes no sense to burn, period. Mulch and sell it. Use it for fuel for something productive. We need to stop this abuse of our air before it is no longer fit to breathe."

There are other, higher-priced options, such as using the waste for composting, livestock feed and animal bedding. But those options are not broadly attractive in a business that has struggled recently.

Electricity production seemed like the perfect answer in the 1980s when state and federal governments were heavily promoting it. More than a dozen biomass plants sprung up and began burning farm vegetation to make electricity.

It is far better for the air. Field research in 1997 showed that controlled biomass combustion was about 95% cleaner than open-field burning.

But, like the other alternatives, the idea has not flourished because of expense. It costs more to produce electricity with biomass or vegetation than it does with natural gas. And it is expensive for farmers to have the waste hauled to a biomass plant.

Several of the plants that opened in the 1980s quickly died off.

A handful of biomass plants in the Valley have been riding the highs and lows, some closing for years at a time and reopening when economics were more suitable.

During the energy crisis last year, a few plants fired back up. One was Sierra Power Corp. in Terra Bella.

The owners continue to wait for state officials and the utilities to help them get a long-term contract.

Sierra Power owner Kent Duysen says he can't keep his doors open without some certainty:

"It cost us $800,000 to start up again after being shut down six years. I think we're done for good if we shut down again."

Cows rival cars as smog producers

The Valley's 2.6 million cows emit tons of gases that turn into pollution, but it's difficult to quantify just how much.

The barnyard is passing the freeway in a race few people even know about -- making smog gases.

Everyone knew cars made these gases, but cows? Indeed, plumes of gases waft from San Joaquin Valley dairies where prodigious amounts of livestock waste are stockpiled. By 2005, cows will lead cars in venting this so-called "reactive organic gas," a main ingredient of smog.

But aren't dairies "mom and pop" businesses where owners live right next to their 80 to 100 cows? How could bales of hay, contented cows and a few pickup trucks make this kind of air pollution?

Because this is no "mom and pop" business anymore. Many dairies have more than 1,000 cows, and many are planned at more than 4,000 animals. The newest Tulare County dairy will have 14,000 cows. Two dairies in Kern County will have a combined 28,000 cows.

These mega-dairies, as environmentalists call them, present problems in winter, too. In the Valley's thick, tenacious fog, tiny particles form as ammonia and combine with other chemicals. The Valley's No. 1 source of ammonia is the dairy industry.

These little ammonia-based specks hang in the fog for hours and easily evade the body's defense mechanisms, penetrating deep into people's lungs. Such tiny particles are now being linked to high death rates and heart problems.

Welcome to the latest revelation nationally about air quality: Cows and other barnyard critters make air pollution.

How much? Enough to regulate the industry?

The debate is on -- from North Carolina to the Pacific Northwest. About a dozen states are beginning to look at regulating cattle, dairy, pork, chicken and egg farms.

In California, the discussion centers around the $4.5 billion dairy industry. The keys are the tiny wintertime particles and an obscure 1938 study that is used as the basis for estimating cow gas emissions.

In the eight-county Valley, these issues hold great importance because the dairy industry flourishes here like few other places in the country. Tulare County is the top-producing dairy county in the nation with products worth $1.2 billion last year, and the rest of the Valley is no slouch either.

The Valley is home to an estimated 1.1 million dairy cows, which is about one-third of the size of the human population here. But if you throw in seasonal grazing herds, beef cattle and other bovine classes, more than 2.6 million cows live in the Valley at certain times of the year.

An adult cow expels 20 times more waste per day than a human.

The waste is concentrated in dairies where many cows are congregated in fairly small areas. Millions of tons of waste usually are flushed into large, uncovered lagoons where it decomposes. Until the 1990s, nobody knew it was an air problem.

"We didn't even list livestock waste in our inventory of emissions until the last decade," says Mark Boese, deputy air pollution control officer in the San Joaquin Valley Air Pollution Control District. "It just hasn't been an issue."

An accurate estimate of the gas emissions should be obtained before regulation is enforced, dairy industry advocates say. They criticize a 64-year-old methane study, which forms the basis of dairy smog projections and environmental impact reports on dairies.

The study, contained in a publication called "Nutritional Physiology of the Ruminant" from the Carnegie Institute, is far too old and off the mark, government experts agree. Additional research has been done, but it hasn't been substantial enough to replace the older work.

Citing sources dating back to 1890, the study concludes about 160 pounds of methane are emitted per cow each year. Methane does not make smog. The study does not investigate smog-making gases from cows.

But cows emit other gases that do form smog. These other gases account for about 8% of what cows emit.

Instead of measuring those gases, regulators have just been figuring 8% of 160 pounds, or 12.8 pounds of smog-making gases per cow each year. The smog-making gases include ethyl alcohol, ethyl amine, isoprophyl alcohol, propyl acetate and trimethyl amine.

But nobody knows if the 12.8 pounds is right.

"We have looked at other studies done in California, but they appeared incomplete and flawed," David Jones, Valley air district planner, wrote in an e-mail.

Dairy emissions controls have been put on hold until a National Academy of Sciences committee completes a study late this year. The study probably will suggest an approach to estimating emissions as well as a discussion of human health and environmental impacts.

Western United Dairymen, an industry group representing 1,100 dairies in the West and more than 700 in the Valley, agrees with the decision to wait on regulation. Michael Marsh, chief executive officer of the dairymen group, says the industry shouldn't be forced to clean up pollution that cannot be quantified.

But environmental lawyer Brent Newell of the Center on Race, Poverty and the Environment says the dairy industry's arguments are irrelevant. Large numbers of these animals can create an air problem, he says.

"We need to regulate first and apologize later," Newell says. "The people of this Valley are suffering from the air. There's no sense of urgency to clean this up."

The urgency should extend to the wintertime problem, too, Newell says.

Here's how the wintertime particles form: Ammonia combines with nitric acid, which forms from pollutants called nitrogen oxides that come from diesel trucks and cars. The combination makes tiny, potent specks known as ammonium nitrate.

Scientists call it PM2.5, which means particulate matter 2.5 microns wide. For comparison, a human hair is about 60 microns wide.

Medical science considers these particles a significant health hazard. The state Air Resources Board suspects 66,000 tons of ammonia annually rising from dairies is the main reason.

To environmentalists, these issues illustrate how the system failed to protect the public from dairies.

Newell's group and the Sierra Club filed a lawsuit about two years ago in Kern County to stop two dairies there with a combined 28,000 cows. The dairies finally gained approval in October. Newell may appeal.

His organization has taken action to hold up dairy expansion in several Valley counties. Most recently, Newell notified the Valley air district of his group's intention to sue over the lack of dairy regulation.

Newell believes the issues should first be handled at the planning level. He says such planning discussions are crucial because of the current dairy boom.

The burgeoning dairy industry is the biggest player in the state's formidable farming business, and large dairy operations are in vogue.

But it wasn't always so. In the 1950s, the state had almost 20,000 dairies, averaging 40 cows apiece. Last year, there were 2,157 with an average of 721 cows. More than half are in the Valley.

Why is the Valley becoming dairy Shangri-La? The inexpensive, wide open tracts of land have been very attractive to dairy farmers who were eager to leave congested Southern California.

So, just as many orange growers left Orange County for the Valley many years ago, Chino-area dairy owners have relocated to the Valley. And dairies have expanded to keep prices down, sales up and profits steady.

But, in their wildest dreams, no one would have imagined how large and controversial dairies would become. Three years ago, environmentalists and state officials began looking into the plans of farming magnate J.G. Boswell to build a series of Kings County dairies totaling about 50,000 cows.

Under fire, Boswell withdrew its plans two years ago, though the door still is open for the same proposals to surface again under many different owners. Yet environmentalists still are asking what would happen to the air with additional millions of tons of untreated cow manure from 50,000 cows.

Now, multiply that question about twentyfold for the more than 1 million cows in the Valley.

Indeed, what happens to the billions of pounds of manure annually produced by Valley dairies?

The manure is commonly stored in lagoons, which are cleaned out a few times a year, depending on the farmer's practices.

The waste often is used to fertilize crops for the cows to eat, or the dairy farmer might sell it to another farmer for use as fertilizer. Typically, a dairy will occupy many hundreds of acres with the animals congregated in a relatively small area where they are fed, milked and maintained.

The close confines create a pungent, highly concentrated brew of emissions, and they are attracting serious study now.

Michael Kenny, executive officer of the state Air Resources Board, says state officials are exploring feed options that will produce less waste. South Coast Air Basin in the Los Angeles area late this year will consider dairy controls that might include faster removal of the waste.

But there is a little-used technology that prevents air pollution while it uses animal waste to make electricity. It is called a digester, or methane-recovery system, which captures gases from the livestock waste and burns it to power an electricity turbine.

For one type of digester, the manure is incorporated into a process that turns it into a thick flow and sends it to a covered concrete pit. The manure slowly decomposes, making methane in the process.

The methane is captured by pipes to power the electricity generator.

But the systems can cost hundreds of thousands of dollars. Only a handful of dairies in California have them.

Western United Dairymen is working with the state on the new California Dairy Power Production Program, which can provide up to 50% of the money needed to build a digester. Nine projects have been approved for funding from the $10 million state grant program, according to Western United.

Without the program, the digester technology is too expensive, says Western United executive Marsh.

"These systems run up to $1.8 million," he says. "I'd say an average cost would be $500,000."

On top of the sticker shock, Marsh says dairy owners have had trouble selling their electricity to privately held utilities, such as Pacific Gas & Electric Co. and Southern California Edison Co., which face money and legal problems in buying from power producers.

Gov. Davis in September signed a law allowing dairies to get credit if their digester systems produce more power than their dairy uses from the utility. In other words, the dairy's billing meter would run backward and give the farmer a credit when it is producing extra power, which is fed into the state's central grid.

In the past, the electricity credit problems have made dairy farmers cool to the idea of digesters. The doubt lingers.

"There's a real hesitation to do it," says Doug Williams, a bioresource and agricultural engineering professor at California Polytechnic State University, San Luis Obispo.

Williams constructed a power-producing $225,000 system at Cal Poly. He says pollution reductions haven't entered the discussion for him yet.

He believes the technology should be widely employed just for the energy advantages:

"I just think manure is a wasted resource if it isn't converted into energy."

Kevin Hall: the unlikely environmentalist

Kevin Hall hardly fits the profile of the radical environmentalist who started the San Joaquin Valley clean-air war and put farming practices under a microscope.

He is a west Fresno County native, who grew up in this farm country where his parents moved in 1958 from Ireland.

Hall, who once owned a farm-related business, says he loves farmers and never intends to leave the Valley.

But now he works full time at cleaning up the Valley's air. In the process, he publicly says farming needs to be closely regulated.

"I think farming is the best industry in the world," Hall says. "But agriculture doesn't own this Valley."

Talk about whiplash.

Says farmer and newly elected Fresno County Supervisor Phil Larson: "I don't know where he crossed the line to being crazy. He understands all the work we're doing [to cut down on pollution]. I don't understand where he's coming from."

From Larson's point of view, Hall seemed like an unequivocal farm supporter. Hall's company, Far West Expositions Inc., put on farm shows. For three years in the mid-1990s, he managed the AgFresno Farm Equipment Exposition in Fresno.

Yet, just 18 months after his last farm show, Hall stood in the San Francisco board room of Earthjustice Legal Defense Fund, pitching the idea of a campaign for clean air. Within months, Earthjustice filed several lawsuits, including a challenge to the state air permit exemption for farmers.

But Hall's transformation didn't jar Paul Cruikshank, a marketing expert who worked for Hall at one point. He says Hall always has been thoughtful, progressive and committed to what he believes.

"Kevin is that guy," Cruikshank says of Hall's full-time commitment to air quality. "I have a lot of respect for him. I'm not sure there was a big transformation."

Hall's life-altering decisions didn't come overnight.

The change started more than four years ago when Hall, 43, and his family began discussing the idea of leaving Fresno. He and his wife, Anne Mosgrove, 53, have one child, Joey, 11, and they worried about his health in the Valley.

The Halls don't have lung problems, but they don't want to develop them.

"We wanted to stay here," Hall says. "We have roots and family here. But we knew we had a problem with the air here."

How could he fight for a Valleywide air cleanup while running his own company? Should he attempt it without a regular job? He wasn't sure.

So he and his wife read a book called "Your Money or Your Life," written by Joe Dominguez and Vicki Robin, which encourages people to learn about their own passions and not let them be stifled by the quest for more money.

The Halls were inspired to cut down on spending and pursue the goals that mattered most to them. Hall decided to set his business aside, at least for a few years, and become a community activist.

Hall says most of his family's modest income is interest earned on investments. He also earns some money as an Irish dance teacher and performer along with his mother, Maureen McTeggart Hall.

Mosgrove, a third generation Fresnan, is a retired dental hygienist. She focuses on their son's home schooling.

With his financial plan in hand, Hall studied air pollution for six months in 1999. He concluded that urban sprawl was the biggest enemy of the air and his son's future health. To Hall, agriculture was simply another pollution source that needed to be controlled along with everything else.

Hall joined the Tehipite Chapter of the Sierra Club in Fresno. He became chairman of the local chapter's transportation, air quality and global warming efforts. Then in late 1999 he contacted Earthjustice about the Valley's air problem.

Few people listened to Hall in early 2000 when he announced his war on air pollution to the Fresno County Farm Bureau's executive committee. The farm industry would be on the list of sources that needed to be addressed, he told them.

"All they wanted to talk was dollars and cents," says Hall. "I wanted to talk lives."

They're listening and watching Hall work on many fronts now. Hall, who later became a Fresno County planning commissioner, worked tirelessly to defeat Measure C, the county's transportation sales tax. He contended the measure should dedicate more money for mass transit and other clean-air tools.

On a statewide level, Hall's work led Earthjustice to file a lawsuit that has forced the federal government to enforce an air permit program on large farms, which had not been regulated.

Hall says he will pursue many other angles, including fees for developers whose subdivisions add more pollution to the air basin. He doesn't intend to let up until he achieves his goal:

"It's simple. I want clean air."

Smog Check fails to get gross polluters

The "Clean for a Day" folks who cheat the Smog Check drive the worst polluters, but "remote sensing" that could catch them on the road remains highly controversial.

It's the centerpiece of California's smog-fighting efforts and a ritual for 20 million vehicle owners.

Every two years, they line up at one of the state's 9,000 Smog Check stations for a 20-minute test that most will pass. It's inconvenient to be sure. But at least

when it's over, lots of high-polluting vehicles will have been found and fixed. Right?

Maybe not.

While most California motorists dutifully submit to Smog Check, a small minority evades it. And the state has no way to catch them.

Some go home after the test and remove or adjust their vehicles' pollution controls. Some skimp on maintenance. Some never pass the test but continue driving illegally.

Their vehicles are called "gross polluters," and they make up fewer than 10% of California's cars and small trucks. But they account for more than half of the state's smog-forming emissions from light gasoline vehicles.

Simply put, the Smog Check program "doesn't catch and repair a lot of the cars that need to be repaired," says Joel Schwartz, former executive officer of an independent Smog Check review committee set up by the Legislature.

California's gross polluters include tampered vehicles and poorly maintained vehicles. They include some of the 500,000 pre-1974 vehicles that won a permanent Smog Check exemption from the Legislature five years ago. They even include some late-model vehicles that you might never suspect.

Finding these gross polluters isn't easy -- except when you're sitting behind them in traffic, with clouds of unburned gasoline trailing from their tailpipes through your car's ventilation system to your nose.

But now there are devices that can sniff out gross polluters just as efficiently as your nose. From the roadway's edge, these devices shine light on a vehicle's exhaust stream and measure how much is absorbed. From that, they can tell how much pollution is in the exhaust.

State regulators have known about this "remote sensing" technology for more than a decade. Repeated studies have concluded that it works at least well enough to identify the worst of the worst gross polluters, whose license plates are photographed as the vehicles drive past.

But regulators have shunned the technology.

California's master air pollution plan, written in 1994, called for the state to use remote sensing to identify gross polluters and target them for repair. A pilot study in Sacramento concluded that remote sensing could accurately identify the most polluting 2% of vehicles. But regulators fixated on some minor technical issues and did nothing further.

The 1998-99 state budget included more than $5 million for further testing, intended to find a way to include remote sensing in the state's smog-fighting strategy. But the money has yet to be spent.

Instead, state regulators have proposed improving Smog Check with a variety of measures that boil down to making the test harder to pass, thereby forcing more borderline polluters into the shop for repairs.

That won't help much, in Schwartz's view.

Smog Check, Schwartz says, has run into the law of diminishing returns. You can't squeeze many more emissions reductions from cars that are being tested. To get big reductions in pollution, you have to go after the vehicles that Smog Check isn't catching.

"Think about a place like Fresno," he says.

"If you could somehow identify and induce owners to voluntarily scrap the 10,000 highest emitting cars, you could reduce emissions from on-road motor vehicles by 25% right now. No big programs. No big expenditures."

Most vehicles pass tests

If anything is clear from almost two decades of Smog Check testing, it's that most vehicles pass most of the time.

Back in 1983, the year before Smog Check began, an Air Resources Board consultant looked at test results from 339 vehicles and found that one-eighth of them were responsible for almost half the pollution.

Today, the pattern is even stronger. Motor vehicle emission controls are far more sophisticated now than in 1983. Carburetors are out, fuel injectors in. Sensors route hundreds of details about engine operations to computers that slash emissions and boost fuel economy and performance.

Typically, a new car leaving the showroom floor today emits only one-tenth as many hydrocarbons -- gasoline vapor and other petroleum products -- as the average car on the road, and one-twentieth of what 1960s-era cars emitted.

Cars from the mid-1990s pass their Smog Check tests more than 90% of the time; they have average hydrocarbon emissions of 12 parts per million. Cars from the mid-1970s pass about 70% of the time with average emissions of 57 ppm, about five times as high as the mid-1990s models.

But the averages mask huge differences, even among cars in the same model year. In any group of cars, there will be a few -- maybe four or five out of 100 -- that have hydrocarbon emissions of 1,000 ppm or more.

These superpolluters include cars whose owners have removed the catalytic converters or made other alterations in hopes of improving performance. They include cars whose owners don't maintain them properly, who neglect routine oil changes, who ignore the "check engine" light. They include innocent owners who are driving cars with major malfunctions and don't realize it.

Mile for mile, just one of these "gross polluters" does as much damage to the air as dozens of average cars.

Maybe hundreds.

Getting them off the road, some scientists say, would do more to clean up the air for less money than any other measure.

"If we could just find those high emitters and fix them immediately, and focus all of our resources on that, we wouldn't even have to test everybody else," says

former Air Resources Board staff scientist Doug Lawson, who served on a National Research Council panel that reviewed Smog Check programs nationwide.

Not everyone agrees with Lawson that testing everyone else is unnecessary. But there is widespread recognition that attacking gross polluters is an important and long overdue task.

The council's panel cited study after study, some by the air board, some by outsiders, all of them making the same essential point -- that the majority of emissions come from a tiny fraction of vehicles.

A 1996 air board study says that the dirtiest 10% of vehicles emitted 47% of carbon monoxide, 59% of hydrocarbons and 33% of nitrogen oxides. More recent studies suggest that the imbalance is growing, probably because as new cars get steadily cleaner, the dirty cars stand out more.

"You have a handful of vehicles that are producing most of the emissions, and it's driving this whole Smog Check program that requires everybody to be tested," says Steven Moss, a former member of the Smog Check review committee. "These cars need to be gotten rid of, one way or another."

Schwartz, who left the committee in December 2000 to work for the Reason Public Policy Institute, a libertarian think tank, argues that the continued presence of gross polluters is an indictment of Smog Check.

"The fact that we find these gross polluters on the road tells you that the Smog Check program isn't finding them and repairing them," he says.

Cheaters a problem

Why aren't they caught?

The reasons are as varied as the factors that create gross polluters in the first place. But chief among them is the one great limitation of Smog Check -- it's a scheduled test, done just once every two years, and always at a time and place of the motorist's choosing.

"This is a human behavior problem," says Lawson, who has been studying Smog Check for more than a decade. Not everyone who drives a gross polluter is cheating, Lawson says. But many are.

A decade ago, Lawson compared results from Smog Check to results for the same vehicles from the state Bureau of Automotive Repair's roadside program, in which cars are flagged down for random, voluntary tests at sites around the state.

Among his findings: Some vehicles came up dirty in the roadside tests just a few days or weeks after they had passed their regular Smog Checks. Those cars should have been clean, but they weren't. Either their Smog Checks were fraudulent, or something made their emissions soar after the test -- maybe a mechanical failure, maybe tampering.

Lawson's analysis couldn't pinpoint a cause. But he suspected cheating was the main explanation.

"Clean for a day," he called the phenomenon.

"It's basic economics and human behavior," he says. People who cheat on Smog Check "don't perceive the economic benefits or the air quality benefits of the program."

More importantly, as Schwartz notes, they also perceive that the test is beatable.

"If you suggest doing scheduled sobriety tests, people immediately realize that it won't work," he says. "The drunks will arrange to be sober when it's time for the test. Why should we expect a scheduled Smog Check to be any different?"

Some cars stay on the road without ever passing a Smog Check.

Tom Wenzel of the Lawrence Berkeley National Laboratory studied vehicle registrations, Smog Check results and other data from 1998 and 1999. He found that one-tenth of the vehicles failing Smog Check never got a subsequent passing grade. Many were junked. But about one in three was still on the road one year later. On average, Wenzel says, those vehicles produced almost twice the hydrocarbons of vehicles that passed.

Wenzel also found that 5% to 10% of the vehicles seen on the road in the state's smoggiest regions, including the San Joaquin Valley, never came in for a Smog Check even though they should have been required to do so.

The air board's own reports acknowledge that Smog Check has fallen far short of its goals. In its most recent evaluation, the agency concluded that Smog Check reduced hydrocarbon emissions in summer 1999 by only half of what the state's 1994 air quality plan required. Nitrogen oxides emissions were reduced even less, only one-quarter of the goal.

Air Resources Board officials declined to discuss Smog Check, referring questions to the Bureau of Automotive Repair, which administers the program.

But an air board spokeswoman says her agency has reservations about targeting gross polluters.

"The ARB is not in the business of removing older, possibly higher-polluting vehicles from their owners' hands or from California's roads," spokeswoman Gennet Paauwe says.

Yet bureau spokesman Glenn Mason says his agency recognizes that it is obligated to look for a way to identify gross polluters between Smog Checks: "The law says to focus the Smog Check program on finding gross polluters," both in the scheduled tests and between them.

The air board's evaluation report points to several additional factors that reduce Smog Check's effectiveness, among them the Legislature's 1997 vote to exempt 500,000 vehicles from the 1966 to 1973 model years.

Three thousand people marched on the Capitol to demand a break for older cars. Thousands more sent letters, including Tonight Show host Jay Leno, who wrote: "The number of cars over the age of 25 on our roads is really quite small ... and most cars that age are driven less than 1,000 miles per year."

But the resulting law not only exempted classic cars owned by wealthy collectors such as Leno, it opened a loophole for old cars of any kind, whether well-maintained or run-down, driven a lot or driven a little.

Subsequent studies have concluded that those older cars account for 1% of miles driven but 4% to 8% of emissions. And without Smog Check, there is little to prevent their owners from removing emissions controls.

Leaking gasoline is another source that the report identified as a gap in Smog Check. One car in 50 is believed to have such leaks, but until last year, those cars could still pass. Even now, a leak isn't caught unless it is heavy enough to be visible.

The report also proposed strengthening Smog Check by sending more cars to specialized stations that conduct only tests, not repairs, and by reducing the emission levels that can make a car fail its test.

It noted that remote sensing had been suggested. But it argued that the pilot study had found "limitations and uncertainties" in remote sensing's ability to find gross polluters. Yet an earlier review of the same data by a bureau contractor concluded that remote sensing could identify the dirtiest 2% of vehicles with minimal risk of falsely labeling clean vehicles as gross polluters.

Now, Paauwe says, air board officials believe that remote sensing is "very good at identifying clean and very dirty vehicles, but not so good at finding those in between."

And she says the agency has other concerns: "The issue for us is that remote sensing is a bit like Big Brother," she says. "There have been some serious concerns over the public wishing to remain anonymous as they drive in their vehicles."

Remote sensing raises concerns

Four states have incorporated remote sensing into air pollution programs.

Colorado and Missouri are using remote sensing to identify clean vehicles that don't need further testing. Arizona used remote sensing for five years to find gross polluters, but too many clean vehicles were tagged and the Legislature ended the program. Scientists who have examined that program say that its definition of a gross polluter was too strict and caused many marginal polluters to be tagged.

Texas is trying to avoid that mistake. For more than three years, it has used remote sensing to identify gross polluters. But to be tagged, a vehicle must emit twice the allowable level of pollutants in two different remote sensing tests.

"If there's any doubt about whether the vehicles are gross emitters, we don't send the notice," says the program's chief, Jimmy Guckian of the state Department of Public Safety.

In California, Bureau of Automotive Repair and Air Resources Board officials are now working on a proposal for another remote sensing pilot study that would use some of a $5.3 million appropriation left over from the 1998-99 state budget.

But Schwartz, whose Smog Check review committee two years ago issued draft recommendations that the state move ahead with remote sensing, says there have been more than enough studies.

He goes to the bookcases that line his Sacramento office, one block from the air board's headquarters, and counts the file boxes that contain reports on remote sensing -- five, six, seven, eight in all.

"Dozens of studies, many of them published in peer-reviewed journals," he says. "We don't need another pilot project. The technology's been around since the late 1980s and it's been evaluated to death."

Schwartz proposes a different kind of experiment. Set up remote sensors in Fresno, get a few million measurements, then send letters to the very worst polluters offering to buy their cars from them for a little bit more than their actual value.

"Just see what happens," he says. "It's voluntary, and it's important to stress that, because there are people out there saying that the government's going to take your car away. It's voluntary, and for people who don't want to scrap their cars, you can offer them subsidized repairs if they're poor."

The logic is simple -- every time you take a dirty vehicle off the road, you make the air a little cleaner. Take a lot of dirty vehicles off the road and you might make the air a lot cleaner.

That's the same logic as the bureau's buyback program, which offered vehicle owners $1,000 for their cars if they failed their Smog Checks. The program bought more than 25,000 cars in 18 months but it came to an end in February, a victim at least for now of the state's budget crisis.

Meanwhile, millions of motorists continue to pass their Smog Checks every two years, while tens of thousands -- maybe hundreds of thousands -- of gross polluters continue to fill the air with avoidable emissions.

"This is stuff we've known for 12 years or more," Schwartz says. "But it's a very slow process to get major changes made in public policy."

Reporting a smoking vehicle doesn't snuff it out

At first glance, it might seem like a good way for the average citizen to help clear the air.

Like other California air districts, the San Joaquin Valley Air Pollution Control District advertises a toll-free number -- (800) 559-9AIR -- to report vehicles that emit visible exhaust.

Callers filed 2,462 smoking vehicle complaints with the district last year, an average of more than seven per business day. In other years, the hot line, which began in 1993, has handled as many as 8,500 such complaints.

But what happens after a complaint is filed? Generally, not much.

Almost three-quarters of the letters that the district sent to smoking vehicle owners last year got no response. Of the rest, half the owners said they repaired the vehicle or junked it. Many others offered comments such as these:

"Vehicle doesn't smoke. On the day this happened, the car next to them was smoking."

"It was snowing and there was condensation, not exhaust."

"Car is fine and he [the owner] doesn't like nonprofessionals who do not understand diesel cars turning him in."

"Neighbor is turning him in. She's an older lady and has done this to several others."

Of the 1,797 letters the district mailed to owners of allegedly smoking vehicles last year, 90 were returned by the post office, 1,289 others brought no reply, and only 217 -- fewer than 1 in 8 -- resulted in assurances from the owners of repairs or other corrective action. For 665 vehicles, no letter was sent because either no registration could be found or they were registered outside the district.

There are several reasons for the hot line's poor performance. The district has no way to tell legitimate smoking vehicle complaints from crank calls. It has no way to tell whether vehicle owners are truthful when they say they have made repairs, or that their vehicles don't need repairs.

Perhaps most significantly, the district has no way to enforce its will. It can't issue fines or other penalties to smoking vehicle owners, even those who are flat-out defiant.

Driving a smoking vehicle is a California Vehicle Code violation and can draw a fine of $100 to $5,000, but only from police, not the district. And the district does not forward complaints to the police, no matter what the details may be.

Valley air district officials nevertheless maintain that the smoking vehicle program has a beneficial effect on air quality.

"First," district spokeswoman Josette Merced Bello says, "it gives everyday citizens an opportunity to participate in air pollution reduction in a tangible way. Second, the number of smoking vehicles on the road [or at least the number of complaints] is going down."

But what about the fact that only one in eight letters results in a smoking vehicle being fixed or junked?

"Well," Bello says, "our response would be it's better than doing nothing."

Dirty diesels face regulations

For years, the diesel industry has fought regulation, always pointing the finger at other sources of pollutants. It even designed engines that ran dirtier when they weren't being tested.

Catalytic converters first appeared on gasoline-powered cars and light trucks in

the mid-1970s. But most diesel engines won't have similar devices until at least 2007, five years from now.

Why not?

Blame regulators with more pressing business.

Blame the complexities of diesel engines and diesel fuel, which created pollution control hurdles that gasoline engines never faced.

But also blame a diesel industry that went to great lengths to escape controls -- at one point even designing engines that emitted less pollution during government-required tests than in normal use.

"For many, many years the diesel industry was very good at keeping the finger pointed at other pollution sources," said Richard Kassel, senior attorney for the Natural Resources Defense Council and leader of the advocacy group's decade-long "Dump Dirty Diesels" campaign.

"The oil industry fought cleaning up the fuel, the engine manufacturers fought cleaning up the engines, and the trucking companies fought any legislation that had a cost attached to it," Kassel said.

As a result, diesel emissions remain a major pollution source.

In the San Joaquin Valley, truck traffic has nearly doubled in the past 20 years, as increases in population and commerce statewide have led ever greater numbers of trucks to crisscross California's midsection.

Regulators now estimate that on-road diesels account for about one-sixth of the region's emissions of nitrogen oxides (NOx), one of the two main building blocks of both summertime ozone and wintertime particles.

But diesels were low on the regulatory agenda for two decades, largely because until the mid-1980s, regulators tried to control ozone mainly by reducing emissions of its other major component, hydrocarbons, a type of reactive organic gas. Diesels produce few hydrocarbons. They produce NOx in spades.

They also produce more lung-damaging small particles than gasoline engines. Some are emitted directly from their exhausts. Others are produced indirectly on cold winter days, when NOx reacts with ammonia from the San Joaquin Valley's factory-farm dairies to create dangerous bits of ammonium nitrate measuring less than 1/25,000 inch in diameter.

Last year, the federal Environmental Protection Agency and state Air Resources Board finally set emissions standards that someday will make diesels as clean as modern gasoline vehicles.

But even though today's diesel engines are much cleaner than those from the 1960s and 1970s, they still have a long way to go before they are as clean as the average new gasoline engine.

"The average person today, when they think of air pollution, they're more likely to think of diesels than gasoline cars and trucks," said Howard Fox, an attorney for another advocacy group, the Earthjustice Legal Defense Fund.

Diesels key to cleaner Valley air

For the San Joaquin Valley, diesel emissions pose a serious threat. But they also offer an opportunity. With many other pollution sources already cleaned up, diesels are among the few where big improvements still can be made. And regulators are counting on that.

"Control of heavy-duty diesel engines is one of the main things that needs to happen for us to meet air quality standards," said Tom Jordan, senior air quality planner at the San Joaquin Valley Air Pollution Control District.

Jordan said his agency's sense of urgency is prompted by the Valley's soaring truck traffic, which in turn is driven at least partly by the region's emerging role as a West Coast distribution hub for major retailers such as The Gap, Wal-Mart and Ikea.

It's easy to understand why diesels are the engine of choice for companies that move a lot of freight. They're economical, consuming about one-third less fuel than gasoline engines for the same amount of power. And they're durable, able to run 500,000 miles or more with regular maintenance.

But diesels also are naturally dirty. Their low hydrocarbon emissions are offset by NOx emissions that typically are much higher without treatment than gasoline engines.

And the smoke that escapes from their stacks is a potentially deadly brew of carbon soot and toxic chemicals. It contributes to the haze obscuring the Sierra, triggers lung spasms in asthmatics and is considered likely to cause cancer.

That smoke contains an encyclopedia full of dangerous chemicals: benzene and acrolein; acetaldehyde and formaldehyde; lead, cadmium and indium; polychlorinated dioxins and dibenzofurans. More than 30 studies have found that workers exposed to large amounts of diesel exhaust run a heightened risk of lung cancer.

Nevertheless, diesels' smaller numbers and their economic importance kept them safe from regulators through the 1960s and 1970s, even as gasoline-powered cars and light trucks were coming under ever-stricter control.

Neither California nor the federal government began placing limits on visible diesel smoke until the 1970s. They didn't address NOx and particles until the mid-1980s.

They've made some progress. Compared with diesels from the 1980s, current models produce about one-third as much NOx and one-sixth as many particles. But that's scant improvement compared with the twenty-fold reductions of gasoline vehicle emissions since controls began. Diesels won't reach that level of control until 2007 or later.

Technical difficulties are part of the explanation. So is the industry's response to those difficulties.

Diesel exhaust is cooler than gasoline exhaust, and its chemical composition is different. For that reason, treating diesel exhaust with devices such as catalytic converters is more difficult.

Instead, manufacturers have tried to meet the standards by fine-tuning their engines, adding turbochargers and aftercoolers, altering ignition timing and fuel injection rates. Those steps lowered engine temperatures and reduced NOx levels. But they also caused engines to burn more fuel and emit more particles.

In the late 1980s, seven engine manufacturers -- Caterpillar, Cummins, Detroit Diesel, Mack, Renault, Navistar and Volvo, which together control 95% of the market -- found a way around that problem. They equipped their engines with special computer controls that could recognize when they were undergoing an EPA test and make adjustments allowing them to run cleaner than in normal operation.

In a series of 1998 court settlements, the manufacturers said their actions weren't illegal and insisted that EPA officials knew about and condoned them. EPA officials denied that.

By then, the government estimated, the manufacturers had sold 1.3 million of the high-polluting engines. The resulting excess NOx emissions equaled the output of 65 million cars. Largely as a result, the average big diesel truck's NOx rose in the 1990s, despite tightened standards.

"It was an absolutely incredible decade-long act of hubris and disregard for the consequences to the environment, across the whole industry," said Kassel, the leader of the "Dump Dirty Diesels" campaign. "In order to get a couple of points improvement in fuel economy, they did something that tripled NOx emissions."

Diesel manufacturers point out that the negotiated settlements didn't require them to agree that they tricked the government. They say the real problem was EPA test procedures that didn't keep up with the changing capabilities of modern electronically controlled engines.

"We were very much in compliance when EPA alleged we were not," said Christine Vujovich, a Cummins vice president. "As an industry, together, we agreed to disagree with EPA."

When the settlements were announced in 1998, Attorney General Janet Reno and EPA Administrator Carol Browner called them a major step in reducing air pollution. They noted that the manufacturers agreed to pay a record $83.4 million in fines and to spend almost $1 billion on other corrective actions.

There was just one problem: Except for requiring that the computerized controls be fixed when an engine was rebuilt, the agreements did nothing to reduce emissions from the 1.3 million high polluters that the engine manufacturers had produced for the past decade.

As of January, more than three years after the settlements, EPA records showed the manufacturers had provided the new controls for only about 2% of the engines that were subject to the update requirement.

"What they should have done instead is a combination of recalls and offsets to make up the emissions from other sources," Kassel said.

The manufacturers did agree to one other step that promises reduced emissions. Starting in October, they began making new engines to meet standards that weren't scheduled to go into effect until 2004. EPA officials estimate that change will remove 1.2 million tons of NOx from the air.

Later, outside of the settlements, standards taking effect between 2007 and 2010 will cut allowable NOx and particulate emissions to a fraction of their 1970s levels. The standards also will force diesel manufacturers to put catalysts, particulate traps and other treatment devices on the exhaust.

Cummins and other manufacturers filed lawsuits to block or delay those rules, arguing that the new standards could not be met without relying on unproven technology. They were joined by refiners that objected to a requirement that they strip diesel fuel of sulfur, which can damage treatment devices.

"The standards would be feasible if the technology to achieve them was feasible," Vujovich said, "but we don't see the technology as being feasible."

In May, a federal appeals court rejected all of the industry challenges.

Environmentalists cheered the court's decision, and the industry has filed no further appeal.

"It really resolves any residual legal uncertainty that exists over the standard," said Vickie Patton, an attorney for the advocacy group Environmental Defense and a former EPA staff lawyer.

Cleanup may take years

The new standards are eagerly awaited by San Joaquin Valley air planners and regulators. As they work to reduce ozone and particles to levels that don't violate clean air laws, the Valley's air pollution officials say diesel will be a major focus.

"It's one of the largest sources that can still have considerable controls placed on it," local air quality planner Jordan said. "We see that as one of the main keys to reaching attainment [with air standards] here in the Valley."

But it won't happen overnight.

Eventually, the diesel emission standards that go into effect between 2007 and 2010 are supposed to prevent 2.6 million tons per year of NOx from reaching the nation's air. But that level of reduction won't be achieved until 2030, when most of the high-polluting diesels currently on the road have been retired.

"Fleet turnover could take 30 or 40 years," Kassel said. "If the goal is clean air this decade, then fleet turnover isn't going to do it."

That's the downside of the long working life of the durable diesel. And it's the consequence of a generation during which diesel controls were less aggressive -- and more widely avoided -- than those for gasoline-powered vehicles.

"We are exactly at the point we were in 1975 when EPA realized we had to take lead out of gasoline to clean up cars. That's exactly where we are," Kassel said.

"At least the question is no longer, 'Can a truck be cleaner?' but 'How quickly can we do it?' That's a major paradigm shift."

Tests prove differences with cars

Poor maintenance can make cars high emitters, whatever their age or make.

If you don't believe that a few vehicles produce most of the emissions, spend some time with Ed VanMil, who oversees a program that tests more than 10,000 cars and light trucks every year.

On a recent sunny day on Stockdale Highway in Bakersfield, VanMil's crew from the state Bureau of Automotive Repair tested 32 cars, vans and pickups for the three main pollutants from gasoline-powered vehicles. The tests are voluntary, and there is no penalty for drivers who fail, so most agree.

The results confirmed what the scientific reports say: Most cars are clean. But when they're dirty, they're really dirty.

The cleanest car was a 1999 Ford Mustang, polished to a glistening white sheen by an obviously proud owner. It emitted 5 parts per million of hydrocarbons -- gasoline vapor and other petroleum products -- at 15 mph and 6 ppm at 25 mph.

Contrast that with the day's dirtiest vehicle, a 1978 Ford E250 Club Wagon van that spewed 1,362 ppm at 15 mph and 1,335 ppm at 25 mph, more than 200 times the Mustang's hydrocarbons.

Diagnosing causes isn't part of VanMil's job, so he can only speculate about why a specific car is a high emitter. In general, though, he credits technical advances such as fuel injection and computer control units with helping keep emissions down.

For example, take a 1986 Ford Taurus that the crew tested after lunch. No question, this car is a beater. The paint is shot and it idles rough. But it's not too bad on hydrocarbons, emitting 132 ppm at 15 mph and 106 ppm at 25 mph.

"That Taurus is still far better than any Ford from the mid-1970s," VanMil says. "Just the fuel injection alone makes a big difference."

The Taurus doesn't do as well on the test for nitrogen oxides, emitting 1,802 ppm at 15 mph and 1,150 ppm at 25 mph. That probably means it's running lean -- too much air and too little fuel in its cylinders.

Even though it's a 16-year-old car, a little bit of maintenance might fix the problem, VanMil suggests.

"The rumor is that old cars fail and new cars pass," he says. "But if you maintain a car well, it will almost always pass, assuming there are no major mechanical failures."

Diesels escape test

Motorists whose cars run on gasoline have undergone smog checks since 1984.

But when state regulators tried to start a similar program for heavy-duty diesel trucks, they ran into a wall of resistance from the trucking industry and were forced to back off.

California's Air Resources Board began inspecting diesel trucks at weigh stations and other roadside sites for excessive smoke and emissions equipment tampering in November 1991. The following month, an Imperial County operator sued to block the inspections.

At each level of appeal, the state won. The same happened with three other trucking company lawsuits. But in the meantime, the Legislature enacted an industry-sponsored bill requiring the board to use a "consistent and repeatable" test and ensure that truck owners would be made whole if their vehicles were falsely identified as high polluters.

In October 1993, the inspection program was suspended. It didn't resume until June 1998, using a new test that the engine manufacturers helped design.

"It wasn't much different from the initial test," says Paul Jacobs, chief of the ARB's mobile source enforcement branch. "The electronics were changed a little bit to make it a little more favorable to industry."

But for almost five years, there were no diesel truck inspections in California. And even today, in a state where some 500,000 diesels are on the road at a time, the program inspects only 15,000 to 20,000 each year. For the rest, the state relies on a self-inspection program, from which owners with only one diesel truck are exempt.

And while gasoline vehicle owners can't renew their registration if they miss a required Smog Check, there is no such requirement attached to the diesel inspection effort.

"We will probably explore maybe having some kind of registration enforcement program," Jacobs says. "But the way it would be designed to work, it's very conceptual at this point."

Electic mowers: the cutting edge

A program to swap gas mowers for electric rechargeables is highly praised by consumers, but may be in jeapordy.

The way Pelton Farr sees it, the deal was just too good to pass up.

For $179, a savings of $200 off retail, Farr bought a new, clean, rechargeable electric lawnmower to replace his old, polluting, gasoline model. Subsidies from the San Joaquin Valley Air Pollution Control District and other state and local agencies made up the difference.

"I want to help keep the air clean," explained Farr, who lives in Merced. "And if the state's going to give me back some of the $485 I sent them last week for taxes, well, that's good, too."

Farr wasn't alone.

On three Saturdays in April, at three Valley locations, the district swapped 1,139 gasoline mowers for the bargain-priced 19-inch electric rechargeables, which sold for less than all but the cheapest gas-powered mowers. The old mowers were sent to a recycler, forever eliminating them as a pollution source.

"My old mower was in really good shape," said another customer, Harvey Lowe of Turlock. "But I heard that a mower puts out as much pollution as 12 cars. If that's true, then I want to do something about it."

It turns out that their old gas mowers were even bigger polluters than Lowe had heard. According to the district, a typical gas mower emits as much pollution as 40 late-model cars, not 12. Beyond that, clumsy Americans spill an estimated 17 million gallons of gasoline per year while refueling them.

This year, the district and its co-sponsors spent $225,000 on the lawnmower exchanges, eliminating an estimated 12 tons of emissions during the mowers' lifetimes.

There's just one problem: At a rate of fewer than 1,200 per year -- the program began just last year -- replacing all of the Valley's roughly 250,000 gasoline-powered lawnmowers will take more than two centuries.

And for other types of equipment, incentives like the one that attracted Farr and Lowe remain rare. The same Home Depot where Farr picked up his electric mower also sells electric edgers, electric chain saws and spill-resistant gasoline cans. Neither the district nor the state has an incentive program for any of those.

"I still use a gas-powered edger, but I'd trade it in if they had a program for it," Farr said. "Plus, I have a two-cycle trolling motor for my fishing boat. It leaves a sheen across the water when it runs. I'd trade that in if they had a program."

But now even the lawnmower program is in peril. In September -- with the manufacturer recalling 140,000 rechargeables for repairs and with the mowers' price scheduled to rise -- district officials decided to call it off, although they still hope to revive it someday.

"We wanted to see what the market was, and quite honestly it has been a strong market, especially up north toward Stockton and Modesto," said Charlie Goldberg, a district marketing and education specialist.

Buyers who took part in this year's mower exchange seemed genuinely enthusiastic about switching from gasoline to electric. And what they said suggests that there may be a lot of pent-up demand for such less-polluting alternatives.

"I tried to get in on this last year but I waited too long and missed it," Lowe said. "I believe there should be a lot more incentives like this. I think it's a great deal."

Gone for better air

A 'breathing vacation' wasn't enough for Jay Orvis.

Just how many Valley residents go for a weekend -- or weeks at a time -- to the Central Coast or the mountains, or leave the Valley for good because of the dirty air?

No one can be sure. But physicians say it's common for patients to take "breathing vacations."

Joseph "Jay" Orvis, 54, left Fresno in July 2000, after doctors advised the U.S. Forest Service worker to move.

Orvis recalls his 18 years in Fresno: "I constantly had bronchitis and I was on antibiotics all the time. That only works for so long, and then it fails to work."

He feels better since moving to Carson City, Nev. "I notice over here that my lungs don't hurt," he says. Orvis is in charge of timber sales administration for the Lake Tahoe Basin.

Breathing dirty air in the Valley for so many years weakened his lungs, Orvis says. And his lung problems haven't completely disappeared now that he is living in Nevada. Last month, doctors prescribed intravenous antibiotics for a lung infection that made him weak and tired.

But, he adds, "If I'd stayed in Fresno, I'm afraid it would be worse, probably quite a bit worse."

He didn't want to leave Fresno, and says he misses it: "The Valley became my home. I had a lot of friends."

But visiting the Valley reminds him of why he left.

"When I come back to Fresno and I come over the Sierras and I look at the air over the Valley, I'm almost appalled at what I see," he says.

Air pollution drove Dr. Stephen Ciesielski and his wife, Lorraine Harris, out of Fresno in 1994. They now live in Beaufort, S.C., a community between Charleston and Hilton Head.

They had mixed feelings about leaving Fresno.

Ciesielski, 44, sounds nostalgic over the telephone in his South Carolina clinic office, as he recalls scuttled plans to practice family medicine in Fresno. The Valley needs doctors who speak foreign languages and he wanted to put his Spanish to use, as well as the Hmong language he was learning.

Ciesielski enjoyed their home in the eclectic Tower District of Fresno, where they lived for about a year in 1993. "That's our favorite house we ever lived in," he says. "I would love to go back, just to see that neighborhood."

Harris, 48, was supportive of her husband practicing medicine in Fresno.

"We just thought it was a wonderful area, but regrettably so spoiled by its pollution situation."

She had no choice but to leave Fresno, she says. She couldn't breathe. "I developed asthma."

Tulare, naturally

The city of Tulare does its part, taking the lead and converting its city fleet to natural-gas vehicles.

With a $2 million natural gas station and leaders who have trouble saying "no" to clean-fuel vehicles, a city of 40,000 could teach the rest of the San Joaquin Valley how to run a cleaner public fleet.

The city of Tulare powers police cars, transit buses, garbage trucks, pickups and other vehicles on natural gas. Sixty-five of the city's 260-plus fleet of vehicles are powered by natural gas, and more are being added each year. "Air quality is a Valleywide problem," says Mayor Bill Cooke. "We will do our part. We will replace our older vehicles with natural gas vehicles as much as we can."

Natural gas-powered vehicles are more expensive than those powered by conventional diesel and gasoline, but generally have far fewer emissions. Most easily surpass the toughest government emissions standards. And the fuel is cheaper than diesel and gasoline.

Tulare officials were sold on natural gas in the mid-1990s when they decided to convert their fleet. The city hit a milestone last year when its $2 million natural gas-fueling station opened. It is available 24 hours a day for the public to buy fuel as part of a 2,000-mile clean-air triangle from Los Angeles to Sacramento to Salt Lake City.

Tulare, which this year received the "Clean Air Award" from the local chapter of the American Lung Association, provides both compressed natural gas and liquid natural gas for its fleet at the station.

Business with private owners of natural gas cars and trucks has not been good yet, says Fire Chief Michael Threlkeld, who supervises fleet operations for the city. But he says Tulare has become the prototype for converting a conventional fleet to clean-air vehicles.

"We've taken the lead," he says. "No question. We have more of these vehicles than other cities in the Valley."

How much of a lead does Tulare have?

Compare the city with Fresno, a city with more than 10 times the population. Fresno has 44 clean-air vehicles in its fleet of 1,800, officials said. Like Fresno, other cities are buying clean-air vehicles, but Tulare is ahead of the curve.

Tulare took a hard look at natural gas six or seven years ago, says Diane Mathis, a former City Council member. She brought up the idea after reading brochures about natural gas fuel at a League of California Cities conference.

"There wasn't a model on how to do this," says Mathis, a paralegal and research assistant at the Tulare County Public Law Library. "But the environment was something I was always concerned with, so I wanted us to convert."

Tulare has become adept at tapping public grants to buy natural gas vehicles. The San Joaquin Valley Air Pollution Control District can provide $2,000 or $3,000 to help purchase natural gas cars and trucks.

The money does not generally cover the entire difference in cost between natural gas and gasoline or diesel vehicles, officials say. But they say the extra cash helps.

The city also picked up grants to cover about two-thirds of the $2 million natural gas filling station, Threlkeld says.

The picture isn't all rosy, officials say. The first natural gas-powered garbage trucks did not operate very well, but there have been improvements.

On the whole, breakdowns and maintenance costs have been fairly similar to diesel and gasoline vehicles, Tulare fleet officials say. But the cleaner-running natural gas vehicles require fewer oil changes. And they seem to have more pep, says Larry Walker, fleet supervisor.

"The natural gas is higher octane," Walker says. "You get better performance."

Trees, plants do pollute

Believe it or not, your edible fig tree sends out smog-causing gas. Many trees do, but your edible fig emits more than many other trees.

The same is true for the spotted eucalyptus and the weeping Chinese banyan trees.

What could you plant instead? Modesto ash, oleander, avocado, Monterey pine, Bradford pear and Chinese elm. They're not as big a problem.

Don't misunderstand. Trees are considered a benefit to air quality in cities, because they lower the temperature. Smog needs heat to form. Trees also convert carbon dioxide into oxygen.

But trees and other plants also send out "biogenic" gases that combine with the nitrogen oxides from cars and other sources to form ozone, the main ingredient of smog.

Plants are many times less significant than cars or refineries as air polluters, but in a smoggy place such as the Valley, plants' biogenic gases are something to keep in mind for landscaping.

Smog isn't the only problem. The natural compounds coming from trees also combine with chemicals, moisture, dust and other specks in the air to create tiny particulate matter, which medical researchers consider to be a dangerous pollutant.

Trees that lose leaves for the winter send out a compound called isoprene. Cone-bearing trees, such as pine and fir, emit monoterpene. Spruce and eucalyptus can emit both.

If you're planting trees and you're wondering what will help the Valley's air, check out the Web site at <http://selectree.calpoly.edu/>, and you will be able to search for trees that fit your needs and have low emissions.

Some smaller plants also are more effective than others at cleaning the air of pollutants, according to experts. The plants include philodendron, hedra helix ivy, golden pothos and wandering jew.

Manure to megawatts

Ron Koetsier invested almost $1 million in what seemed like a simple system to extract methane from tons of cow manure and burn it to make electricity for his Tulare County dairy.

But something equally simple derailed him -- mud. And it took him years to resolve the problem.

Koetsier is a rare breed of dairy farmer, willing and able to spend a lot of money on a technology that scares many of his peers. Systems such as his allow manure to decompose while they capture the resulting methane and send it to a generator to make electricity.

In the process, the methane or biogas system prevents most of the pollution-causing manure gases from escaping into the air. Seemingly, it's the perfect air-quality and energy-producing answer for dairy farmers.

But many dairy farmers are discouraged by the expense and difficulty in selling their extra electricity to utilities. If that's not bad enough, Koetsier's story would make many folks run the other way.

In the late 1980s, mud made his life miserable as he tried to flush manure out of open corrals into a pit where the manure could decompose.

Too much mud flushed into the pit. His so-called plug-flow digester operates on manure, not mud. It just didn't work.

Koetsier had to shut down the digester for years until he could replace his stalls and buy a vacuum truck for his 1,450-cow dairy. He paid another $200,000 to make it work.

"Now we suck the manure off the lanes daily," he says. "It's still pretty simple. But it's labor intense. It takes four or five hours a day."

He moves the manure to a covered concrete pit. The manure slowly decomposes, making methane in the process. The methane is captured in pipes to power a 130-kilowatt electricity generator.

Other versions of the digester system can cost less, experts say. But the cost still could be several hundred thousand dollars.

A recent government incentive program is attracting attention from a few dozen dairy owners, but many operators still are cautious.

"It's another layer of management and expense," says one dairy official who asked to remain anonymous. "That discourages many people."

Not Koetsier. Even if he has to buy some energy from Southern California Edison Co., he believes he will reduce his monthly bill by up to $7,000. With electricity price increases over the last year, he may save even more.

"We want to run our generator all the time," he says. "Normally, we'll sell more than we buy."

That means Koetsier wants to produce enough electricity to run his dairy and send the surplus into California's central grid. Koetsier likes the idea of being insulated from energy problems such as the rolling blackouts that occurred last year.

"I'll be in control of my own utility bill," he says.

Cleaner air requires major change

To better the air quality in the Valley, many say we need the kind of wake-up call L.A.-area residents got. A cleanup is no longer optional.

Move Fresno and Bakersfield out of the San Joaquin Valley.

That's one way you could clear the murky air to reach the federal health standard. That's 675,000 people and their cars, barbecues and lawnmowers.

You could shut down about 7,000 Valley businesses between June and September. Or, how about banning driving three days a week on all Valley roads?

Each of those unlikely scenarios would flush 300 tons of pollutants out of the air daily.

No one would seriously recommend these solutions, but the scenarios accurately portray the gut punch that soon will land in the Valley: A dramatic air cleanup will touch the lives of everyone who lives here.

And this cleanup is not optional, says the federal government.

Don't believe it? Look south of the Tehachapi mountains. That same cleanup message arrived in the early 1980s.

Using heftier political muscle than you would find in the Valley, the Los Angeles area resisted through 15 years of lawsuits, heated public debate and threats from the U.S. Environmental Protection Agency.

When the dust settled a few years ago, L.A.'s attitude finally had shifted like the San Andreas fault. Angelenos got the message. Instead of being the punch line for a dirty-air joke, L.A. became synonymous with innovation in air cleanup.

Now the Los Angeles area's South Coast Air Basin hasn't had a smog alert in four years. Federal air violations have dropped 75% over the past decade.

The whole nation now marches to the beat of air cleanup in Los Angeles, which employs everything from the least-polluting paints to the tightest regulations anywhere for the petroleum industry. When another city or air basin needs to reduce air pollution, L.A.'s cleanup measures provide all the latest answers.

For instance, Los Angeles required its largest employers to partially pay for employee fares on mass transit for commuting purposes. Large employers also began charging employees for parking as a way to encourage car pooling or riding the bus.

Los Angeles doesn't have healthy air yet, but the worst episodes of eye-burning smog seem over.

In fact, South Coast has violated the eight-hour smog standard -- an average reading over eight hours that exceeds the level where lung damage begins -- fewer times than the San Joaquin Valley during the past four years.

"There was a kind of enlightening," says Barry Wallerstein, executive director of the South Coast Air Quality Management District. "You have to get beyond the denial stage, or you won't be able to solve your problems."

A lot of the South Coast's success can be attributed to cleaner automobiles and fuels. The same vehicle advances, and many of South Coast's other controls, have helped in the Valley, but geography, climate and population growth are turning the Valley's stubborn haze into a crisis.

To solve the air crisis, Valley residents need an L.A.-like awakening, say environmentalists, community activists and others. They think Valley residents must raise air quality on the agendas of city councils, boards of supervisors and state and federal legislators, who can provide the legal muscle to do something about pollution reduction.

People also should make air quality a priority in their own lives, say air district officials: Consolidate vehicle trips, walk or ride a bicycle to do errands. Use a gas grill instead of charcoal. Don't burn wood in your fireplace.

Every bit of pollution reduction will count in a place where dirty air hangs for days in stagnation.

"People need to understand they're creating pollution when they start their car and drive two blocks to buy milk," says David Crow, executive director of the San Joaquin Valley Air Pollution Control District. "The car never warms up, so its emissions are at their worst."

More miles will be driven as the Valley's population grows from 3.3 million to 4 million people in the next decade. Air district officials are counting on new engines and fuels to reduce about 120 tons of pollutants a day in the next several years.

New rules on industries will cut another 56 tons. But where will the final 120-plus tons of reductions come from while the Valley population quickly expands? There are many ideas, but few solid solutions are being discussed publicly yet.

Aside from driving restrictions or something similar, there is no magic bullet yet. Nobody knows how to squeeze that much pollution from the air.

The Sierra Club and medical community activists suggest a starting place: Slow sprawl, clean up agriculture and invest in mass transit with clean fuels.

Currently, new developments and regional warehouses are paving over Valley farmland. Businesses have discovered the cheap, available property, something that isn't in large supply in Los Angeles and the Bay Area.

But developments add pollution. Larger developments can add hundreds of tons of pollution, primarily from vehicles.

That's many times the level at which major pollution sources, such as refineries or glass factories, must get federal permits. But subdivisions aren't regulated that way.

Change the rules to make them pay their way for air quality, says Sierra Club member Kevin Hall, a Fresno County planning commissioner. The system already makes new businesses pay.

For example, a new power plant would have to buy the right to pollute the air. For each ton of pollution the plant creates, it would have to buy more than a ton of pollution savings that has been accumulated through previous reductions by other businesses.

These are "emission reduction credits," which are banked for various businesses. A nitrogen oxides credit costs $27,500, but the cost fluctuates. If a business needed to buy 20 credits, it would cost more than $500,000.

Hall says other polluters should pay in the same way.

"Why not have a fee for developments or regional warehouses that run trucks in and out every day?" he asks.

Environmentalists believe these new arrivals should be charged a per-ton fee for pollution. The local air district could raise millions for clean mass transit and fleet conversions to clean fuels, such as natural gas or electric vehicles, they say.

The money also could be used to help cut back on open-field ag burning by subsidizing a program to deliver farm waste to biomass power plants in the Valley.

The money also could fund incentive programs to replace dirty farm diesel pumps on wells or to build systems for using cow manure to make electricity. Both efforts would reduce farm air pollution.

How much money would society be willing to invest this way? Economists say that's the key question. Joel Schwartz, senior fellow at the Reason Public Policy Institute, a libertarian think tank, says the cost of cleaning up the air is borne by consumers.

"We should always be looking for the least costly ways to improve our welfare," he says.

He argues that going after gross-polluting cars would be more cost-effective than trying to further reduce emissions on cars that are low-polluting.

One answer may be remote sensing to identify gross-polluting vehicles. From the roadway's edge, these devices shine light on a vehicle's exhaust, measuring how

much light is absorbed in the process. The more light absorbed, the more pollution is coming out.

Gross polluters amount to fewer than 10% of California's vehicles. But they put out more than half of the state's smog-forming emissions from cars and light trucks. The state currently has no way to catch them.

Since vehicles are the major air problem, why not require public fleets -- school buses, transit buses, city cars, county trucks -- to use only clean fuels? The San Joaquin Valley Air Pollution Control District is considering that.

Clean-air vehicles cost more money than conventional vehicles. If the government provided more money to help buy these vehicles, environmentalists say, there would be more of them on the road.

Yosemite National Park this year picked up a $96,000 grant from the National Park Foundation to buy 12 zero-emission electric vehicles that can be charged from any household outlet. With top speeds of 25 mph and a 30-mile range, they're perfect for short trips around environmentally sensitive Yosemite Valley.

The public's influence on decision-makers could play a big role in many other issues.

They include:

Building more natural gas filling stations in the Valley. Coalinga, Tulare and Madera have them, and others are planned in Fresno, Stockton and Sacramento.

Many agencies consider vehicles powered by natural gas to be a cleaner alternative to diesel, although diesel engines and fuel are expected to be cleaned up dramatically in the next five years.

Changing the makeup of the air pollution control district board, which is currently filled with local supervisors and council members from the eight counties. Turn at least two or three board member positions into appointments for people who have an expertise in air, medicine or law.

On some state boards, including the California Air Resources Board, members with an area of expertise are appointed. Such board members can advocate from a position of authority on the board.

Making funding available again for the state's Vehicle Retirement program, a casualty of the state budget crunch. If an older car fails the smog test, the state would buy it for up to $1,000.

The Consumer Assistance Program provides up to $500 worth of repairs to help cars pass their Smog Check.

Constructing smaller power plants that provide "renewable energy," such as those run by biomass, wind, solar and geothermal energy. Energy experts say it would help if these power plants, particularly biomass, were spread more widely throughout the Valley, reducing the need for Central California to take electricity from the larger grid that supplies the rest of the state. Most believe state officials would have to commit more money to support such plants.

Dedicating more public money for clean-air alternatives to driving, such as mass transit. The transportation tax on the November ballot, Measure C, did not pass, but many believe it would be a good source of public transportation funds. The Measure C proposal set aside 13% for such issues, but the League of Women Voters and others believe the figure should be closer to one-third.

Preparing for rail. The northern Valley has three trains carrying thousands of commuters daily from Stockton to San Jose. When the commuter trains began in October 1998, they had about 750 passengers a day. As of February, ridership had grown to 3,812 a day.

Designing land use more practically and efficiently. Trucking distribution centers should be built close to freeways. Warehouses should be close to the stores they supply. Subdivisions should be built without conventional fireplaces. Larger developments should be close enough to stores and other amenities for residents to walk or ride bikes.

The downtowns of Valley cities should be revived, say planners. Growth and development should fill in the gaps within cities instead of creating sprawl.

Research also indicates trees can help reduce the temperature and filter some pollution from the air. There also is evidence that tree shade over parking lots cuts down on pollution-creating gases coming from cars.

Emphasizing regional transportation. Fresno Mayor Alan Autry is calling for a regional air summit in February, and regional transportation probably will be near the top of the agenda.

Robert Johnston, a land-use researcher at the University of California at Davis, says travel between cities is as important as travel within cities. He says the Valley hasn't yet taken a serious look at the issue.

"It's pretty hard to reduce travel right now because gas and cars are so cheap and parking is virtually free in many places," he says. "Sprawl is something that should be on the table in the Valley. When you're talking about sprawl, you're talking about lots of traffic."

What Can You Do?

Carpool or ride a bus.

Maintain your car. You will cut back on pollution by keeping your car properly tuned and inflating your tires to the proper level. Also, don't top off the tank at the gas station because it releases more vapors.

Walk or ride your bicycle to the store.

Don't warm up the car for long periods of time.

Avoid idling the car at drive-up windows or at train crossings.

Avoid aggressive driving. Hard acceleration puts the car in a mode called "power enrichment" in which extra gas is forced into the cylinders, resulting in a spike of pollution emissions.

Minimize use of off-road motorcycles and all-terrain vehicles. The state Air Resources Board estimates such vehicles often produce many more pollutants than modern automobiles.

Consider trading in your 1980s or older vehicle for a newer, cleaner-running car. Your choices now include electric, hybrid electric-gasoline and natural gas vehicles. The electric vehicles emit zero pollution. The others put out 50% to 90% less pollution than a conventional gasoline-powered vehicle.

Attend a city council or board of supervisors meeting and support clean-air transportation alternatives, such as natural gas public fleets or electric vehicles. Also go to a San Joaquin Valley Air Pollution Control District board meeting to support clean air regulations.

Encourage employees to carpool, arrange schedules so employees can ride the bus and provide bicycle racks and other incentives to get people to ride bicycles to work.

Support infill development in existing neighborhoods instead of construction of new housing developments that create leap-frog sprawl and increased travel time to jobs and shopping.

Buy energy-conserving refrigerators, washers, ovens and other appliances. The less energy you use, the less fossil-fuel plants need to run and send out pollution.

Consider installing solar power at your home. Each kilowatt-hour produced by "renewable" power producers means a pollution savings from fossil-fuel power plants.

Switch from your gasoline-powered mower to electric. In fact, go electric on as many yard tools as possible -- hedge trimmers, edgers, chainsaws.

Buy a gas grill. Or switch to a chimney starter for your charcoals and don't use starter fluid, which sends out pollution.

Stop burning your wood in a standard, masonry fireplace. Use a federally certified wood stove or similar device. Or don't burn at all.

Seal all paints and solvents in the garage. Escaping fumes contribute to air pollution.

Use water-based paints when possible because they emit less ozone-making gases.

Monitor your children's outdoor activities on bad-air days. Check the Air Quality Index on the weather page of the morning newspaper to determine the air quality forecast for that day. And remember that health advisories are generally announced in the late afternoon, after the school day has ended.

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Air pollution Web sites

San Joaquin Valley Air Pollution Control District: www.valleyair.org <http://www.valleyair.org>

California Air Resources Board: www.arb.ca.gov <http://www.arb.ca.gov>

Environmental Protection Agency: www.epa.gov <http://www.epa.gov>

California Office of Environmental Health Hazard Assessment: www.oehha.ca.gov <http://www.oehha.ca.gov>

American Lung Association of California: www.californialung.org <http://www.californialung.org>

Bureau of Automotive Repair: www.smogcheck.ca.gov <http://www.smogcheck.ca.gov>

Western United Dairymen, methane energy production grants: www.wurdco.com <http://www.wurdco.com>

Emission credits brokerage: www.emissionstrading.com <http://www.emissionstrading.com>

Ozone in national parks: www2.nature.nps.gov/ard/gas/exceed.htm <http://www2.nature.nps.gov/ard/gas/exceed.htm>

Guide to the Clean Air Act: www.epa.gov/oar/oaqps/peg_caa/pegcaa02.html <http://www.epa.gov/oar/oaqps/peg_caa/pegcaa02.html>

Check for ozone hot spots: www.epa.gov/airnow/ozone.html <http://www.epa.gov/airnow/ozone.html>

Project Clean Air in Kern County: www.projectcleanair.org/about.html <http://www.projectcleanair.org/about.html>

News on clean-fuel vehicles: www.valleycleancities.org <http://www.valleycleancities.org>

California officials fret over federal air pollution plan

The Associated Press

Wednesday December 11, 2002, 07:20:09 PM

LOS ANGELES(AP) - State officials worry that a Bush administration plan to lower smog levels within a decade could lead to short-term increases in pollution.

The administration has not released its plan publicly, but Environmental Protection Agency officials have met with states to outline the proposal.

The federal government currently requires states to hold hourly ozone levels below federally established standards. The EPA has decided to convert to a system that will measure average ozone levels over eight hours.

The eight-hour standard will be stricter than the one-hour standard. The deadlines for achieving the longer standard, however, are expected to be so far in the future that California officials fear local pollution control agencies will lose momentum.

"We're afraid this will be a signal to air officials and industry around the nation that they don't have to work as hard to attain clean air because suddenly they're given a 10-year reprieve," Jerry Martin, spokesman for the state Air Resources Board told the Los Angeles Times. "We don't think the breathers of California can afford a 10-year reprieve."

State officials, who worry the EPA will revoke the one-hour standard and leave local agencies with no deadline for years, instead want the federal government to enforce both standards.

Most of the state's main urban areas fail to meet the one-hour standard and nearly 30 million Californians live in areas that have not met it yet.

San Diego recently reached the level and the San Francisco Bay area is approaching it. Los Angeles, which is far from attaining the standard, has a 2010 deadline before it would face punitive action from Washington.

EPA officials said no final decision has been made on implementing the new standard and stressed the plan would not hinder the state's attempts to reduce pollution.

"We're not going to do anything that is going to slow down the momentum in California to reduce ozone levels," said Jeffrey Holmstead, assistant EPA administrator for air and radiation.

The state's concerns will be considered as the proposal is designed, Holmstead said. The plan is expected to be unveiled early next year and made final by the end of 2003.

The Clinton administration adopted the stricter eight-hour standard, but in order to ensure a smooth transition, put in place a rule keeping the one-hour standard until an area had attained it for three years in a row.

The Bush administration was forced to retool implementation of the plan following a 2001 U.S. Supreme Court ruling that upheld the eight-hour smog standard. The high-court told the agency to redesign its plan for implementing the standard, which was challenged by truckers and other industries.

News in brief from the San Joaquin Valley

(Bakersfield Californian, December 12, 2002)

The Associated Press

Wednesday December 11, 2002, 10:10:05 AM

BAKERSFIELD, Calif. (AP) - The Shell Oil Co. refinery was the source of a stink that caused the evacuation of hundreds of people in the downtown area last month, air quality regulators said.

The San Joaquin Valley Air Pollution Control District issued two notices of violation to the refinery Tuesday for creating a nuisance and having an inoperative vapor recovery system. The stench resulted from the

inoperative system, which is intended to collect hydrocarbon vapors from tanks at the refinery, regulators said.

Air district spokeswoman Kelly Hogan Malay said Shell could be fined tens of thousands of dollars, depending on the outcome of a settlement.

Shell spokesman Cameron Smyth said the company is reviewing the notices.

At least seven people went to hospitals reporting breathing difficulties as a result of the foul odor that last several hours on Nov. 12. Hundreds were evacuated from buildings, including employees in the air district's offices.

Critics sound alarm bells over plan

By JAMES BURGER, Californian staff writer
e-mail: jburger@bakersfield.com

Wednesday December 11, 2002, 10:55:05 PM

The term "significant and unavoidable impact" shoots up red flags for the Sierra Club and the Smart Growth Coalition.

The groups believe the phrase used in the Metropolitan Bakersfield General Plan indicates a flood of traffic, smog, noise pollution and urbanized farmland may swamp Bakersfield over the next 18 years.

City Planning Director Stan Grady said city officials aren't giving up on Bakersfield's future with the words "significant and unavoidable."

"It doesn't mean we aren't doing everything we can," he said. "It just means we can't prevent a significant impact."

The Bakersfield City Council was asked to approve an update of the General Plan Wednesday night with those words tagging four major issues -- traffic, air pollution, noise pollution and the conversion of farmland to urban uses.

"The fact you use the verbiage of 'significant and unavoidable' is unacceptable," said Smart Growth representative John Fallgatter.

"For us to accept this document without questioning it is a disservice to the community."

Gordon Nipp with the Sierra Club had some ideas.

"We think that there are some progressive things that can be done -- albeit not without pain," he said.

He suggested pushing light rail and bus programs, forcing developers to build homes and businesses closer together and drawing a boundary around the metro area at which development would stop.

"Send this update back to the planners," Nipp said.

"Tell them to come up with alternatives that would deal with the unavoidable impacts."

But Grady said the metropolitan Bakersfield area has not been planned for things like urban boundaries.

"Our plan provides for low-density development around town," he said. "We don't mandate that (developers) do high density."

He said traffic and air pollution from outside Kern County have a huge role in fouling the air here.

"If we stopped everyone from driving in Kern County we would not materially improve the air quality in this valley," Grady said.

The council was still debating the General Plan update at press time.

Ban on wood burning discussed at Better Breathers Club

Mike Jensen, Merced Sun-Star, December 12, 2002

Annis Stout, 78, doesn't think banning residential wood burning will do much to improve the Central Valley's air pollution.

But Lorraine Cathey, 79, thinks it's a good idea.

Both women suffer from chronic breathing ailments that are worsened by the Valley's air pollution and both attended the monthly meeting of the Better Breathers Club in Merced Wednesday.

During the meeting, a spokeswoman from the regional air district spoke about air pollution and the expected ban on residential wood fires.

The San Joaquin Valley Air Pollution Control District - an agency responsible for cleaning the air from Bakersfield to Stockton - has recently announced plans to ban wood-burning in stoves and fireplaces on nights when air pollution is particularly unhealthy.

The district says fires would probably be banned about 20 times over the winter but hasn't yet determined how to enforce the regulation.

Stout, a Snelling resident and retired school teacher, said the ban seems like it "could be" just more government control over people's freedoms.

Stout said she routinely wakes up with red eyes from nearby smoke created from agricultural burning.

As for how much air pollution might be kept from the air, she said, "That's just a drop in the bucket. They're making a big stink about nothing."

But Cathey, a retired Merced almond grower, disagreed.

She said the ban is a good idea as long as the air district follows through with its plan to exempt Valley residents who are unable to heat their homes without wood.

"I think in many areas, there is too much government control," she said. "But when it comes to health, it should be given some consideration."

Also, she said, residents holding back on wood burning might help offset the smoke created from agricultural burning.

"I'm sure it does contribute to the problem," she said of ag burning. "But I feel it is necessary to give some leeway to the farmers."

Henry Moreno, a respiratory therapist who runs the pulmonary rehabilitation center for Mercy Medical Center Merced, leads the monthly Better Breathers Club.

He said Wednesday that he supports the ban on wood burning.

"I think that fireplaces are overused in this area."

Moreno said that while burning wood may be a way cheap way to heat a home, the cost is made up in medical bills for visits to emergency rooms and doctors.

"It's just passing the dollar to somebody else," he said.

Josette Merced Bello, the air district spokeswoman, said there are about 600,000 homes throughout the Valley that have at least one fireplace or stove. Each contributes about 17 teaspoons of fine particles to the Valley's air pollution each hour.

She said the district is particularly concerned about tiny microscopic particles that can get trapped in the lungs.

Fireplaces are a large source of the pollution, she said. Other sources include agricultural dust and diesel exhaust.

"We need to look at all of the sources and control all of the sources," she said.

Several attendees raised concerns about agricultural burning.

Merced Bello said agricultural burning is allowed under state law and the air district can only manage how and when burns take place.

She said the district is developing new plans expected to reduce the air pollution from ag burning.

Part of the problem, Merced Bello said, is that growers are often restricted from burning for several bad air days in a row.

When the restriction is lifted, too much material is burned at one time, she said.

In 2003, the district plans to let farmers burn on more days but burn less material each time.

"It's spreading out the impact so there's less impact overall," she said.

City engineer to recommend synchronizing study

Mike Jensen, Merced Sun-Star, December 12, 2002

You're driving down G Street in Merced and come to a red signal light. You stop and wait. The traffic light turns green and you start rolling again.

Then you hit another red light, then another and another.

Sitting at red lights in Merced isn't just annoying. It's bad for the Central Valley's air, already considered some of the most unhealthy in the nation.

But both the flow of traffic and the city's air quality could improve within the next couple of years.

City Engineer David Tucker said he's recommending that the city council include funds in next year's budget to study the effects - and funding sources - of synchronizing some of Merced's traffic signals.

Aside from saving drivers headaches, synchronizing lights may also spare their lungs from unhealthy nitrogen oxide emissions.

"Generally anything that reduces idling is good," said Josette Merced Bello, a spokeswoman for the San Joaquin Valley Air Pollution Control District.

Merced has already reduced air pollution once by replacing stop signs at Highway 140 and Motel Drive with a traffic light and making some road improvements there.

More than 21 tons of nitrogen oxide emissions will be spared from the Valley's air over the next 20 years, according to documents obtained from the air district.

That's about six pounds less pollution each day at one intersection by improving the flow of traffic.

The cost of removing six pounds of air pollution comes out to about $130, mostly paid through state sources.

As for synchronizing the city's traffic lights, it remains to be seen what the cost might be to local taxpayers.

According to Theresa McIntire, a city engineer, the cost to study synchronizing Merced's lights could exceed $100,000. That doesn't include the cost of the actual work.

And at the same time the city council begins to consider funding the traffic light study, councilmen will be also deliberating on ways to cut dollars from other municipal spending.

Under Gov. Gray Davis' proposed $10.2 billion state budget cut, the city stands to lose about $210,000. That includes $150,000 from the city's street maintenance fund.

The city's Redevelopment Agency funds, separate from the general fund used for city services, could also lose more than $1.25 million under the Davis proposal.

The full impacts to Merced won't be known until the state Legislature convenes in January and votes on Davis' proposal.

But City Manager Jim Marshall has said the city can expect to see cuts in its general fund revenues as the state tightens its spending.

Some funds to do the synchronization work may be available from federal sources.

"If they're available, we'll certainly go after them," said Tucker, the city's engineer.

The city council will begin talks about the next fiscal year's budget in February.

City Councilman Stan Thurston said he wants to see the study done so grants can be obtained for the actual work of synchronizing the lights.

"I've been trying for years to get that done (for) at least the major thoroughfares," he said.

Thurston said some funds may still be in the city's coffers from developers' fees.

Councilman Joe Cortez said he supports synchronizing the lights because doing so will improve air quality and traffic flow.

"With the way the city is growing, we're going to have do that, certainly," he said.

But he also said the city council needs to "take a close look" at the funding source because of the state and city budget woes.

Councilman Jim Sanders said Wednesday that light synchronization is "desperately needed" in Merced.

He said some city money may be available that's unaffected by the state budget. Once he knows more about the source of funds, he'll make a decision about the study, he said.

"Traffic in our city isn't going to stop because there's a budget crisis," he said.

Mayor Hub Walsh could not be reached for comment, nor could other councilmen.

Senior reporter Mike Jensen can be reached at 385-2453 or mjensen@mercedsun-star.com.

Traffic signals need to be synchronized

Mike Jensen, Merced Sun-Star, December 12, 2002
It's called "stop-and-go driving," and it's enough to drive even the most mild-mannered person to road rage.

Getting speedily from Point A to Point B on Merced's main arteries can be an exercise in futility - and often far from speedy.

Sitting at red lights in Merced isn't just annoying. It's downright detrimental to our air, which is already considered some of the most unhealthy in the nation.

Getting Merced's stoplights synchronized won't happen overnight, however, and it won't come cheap.

First, the city has to come up with the money to conduct a study of the effectiveness of such an endeavor. And we're told that could cost upwards of $100,000.

The San Joaquin Valley Air Pollution Control District - the "Spare the Air" folks - assures us that timing the traffic lights will help reduce the volume of pollutants that are pumped into our air. And that's good news.

While our traffic is far from big-city gridlock, the increased population that we know is coming will only add to the problem.

This science of synchronizing stoplights isn't, well, rocket science. It means that if you're driving on a long boulevard at a constant speed (say, 30 mph), you can hit most of the intersections en route with a green light.

This is a concept that's been used in Europe for decades. In Germany, this well-conceived system is known as the "green wave," and many drivers automatically adjust their driving rhythms accordingly.

We heartily agree with those city officials who are behind synchronization. Aside from preventing commuting headaches during rush-hour gridlock, timing stoplights is sure to spare our lungs from unhealthy emissions from idling engines.

Right now, it seems that the burden of payment will have to come from the city's general fund. And as we know, the city's purse strings are being pulled tighter and tighter, especially after Gov. Gray Davis' proposed state budget cuts.

We don't have all the answers, but we know one thing: This makes sense - for all of us.

We urge the council to put this problem on the front burner and pursue funding to get the initial study off the ground.

Opinion Piece, Modesto Bee, December 11, 2002

Modesto development reflects a feedlot mentality

By MIKE HART

When George Petrulakis wrote his column, "The sky is not falling and growth is not sprawling" (Nov. 19, Page B-6), it was as if we read the same article on growth and came away with different conclusions.

He cites the sprawl of Modesto as some sort of accomplishment. Modesto has spread over the land like a cancer. Mile after mile of farmland traded for identical rows of overbuilt homes without a tree in sight. Modesto has ceased to be any sort of identifiable community and instead become a random collection of subdivisions stretching toward the sunset.

He cites a Solimar study which found that "Modesto was the most efficient of the four cities and outstripped the city of Davis" in its use of land. "Davis only houses about half the number Modesto houses per converted acre because of its large lot and open space requirements." By ignoring public space, any means for pedestrians and bicyclists to get anywhere, parks and greenbelts, Modesto managed to pack in more houses in per acre than Davis -- or anywhere else, for that matter. Let's stage a victory party. Where's the champagne?

Ranching is in the history of Stanislaus County and folks here understand cattle. On the range, you may only get a few cows per acre over long, idyllic miles of rolling countryside. When it's time to bring the cattle in for slaughter, you pack them into feedlots where they are packed hundreds to the acre.

To accomplish this, you skip all the niceties and focus on density. A feedlot is an artificial environment that requires an enormous amount of feed and support to sustain it, allow that support to slip and the consequences are dire.

It appears that Petrulakis applauds this mentality in housing development. Yes, Modesto has packed in houses more densely than Davis, but at what cost?

It's not just a matter of trading farmland for identical stucco-clad houses. It is a matter that Modesto's sprawl has created congestion and pollution. These houses are miles from stores and entertainment and there are few trails and greenbelts to connect them. Worse still, the jobs lie two hours away over the mountains. Every morning an army of cars, each with a single occupant, heads over those mountains to their jobs by the bay. What happens when those jobs go away or fuel prices rise to their true market cost? Creating hundreds of acres of housing without any real effort to create matching jobs has created an imbalance with long-term consequences.

Petrulakis claims that this sprawl has played a role in making California the fifth-largest economy in the world is misleading. If anything, this sprawling development has created an economic drain on local governments and schools, which may have pushed California over the financial edge.

There is an economic boon with each development for builders and a farmer cashing in on "the final harvest," but it is the community that has to pick up the tab for the unfounded costs of development. There is another cost, a long-term commitment to congestion and pollution created by each poorly planned development that maximizes density at the expense of community.

Hart, an Oakdale businessman, is a visiting editor on The Bee's editorial board.

Letters to the Editor, Bakersfield Californian, Dec. 12

Muffle leaf blowers

I live in Kern City, a suburb of Bakersfield. I am being driven nuts by leaf blowers -- seven days a week.

I agree 100 percent with Larry Beck, a recent person writing about this problem.

I had to fire my grass cutter because he would not listen to me. He was cutting my grass every week even when I told him not to.

He then told me he was doing me a favor by cutting it once a week, although he was almost down to the bare earth.

These people move in from different places and the next day they are all gardeners.

The noise problem is terrible due to these leaf blowers. I see them in here using them on lawns with all stones, so these people are just taking advantage of the elderly in here figuring we are all senile, with no brains.

Let's stop this ordeal by limiting them to one day a week and let's hope somebody invents a muffler to put on these noisy machines.

These people are just after the money and couldn't care less about the air pollution they are creating. We have a Board of Directors in here, but they all seem to be on vacation and do nothing about this situation.

VIRGINIA G. PETTIT, Kern City

Letters to the Editor, Merced Sun-Star, Dec. 12

Restricting fireplaces is unwise

Editor: First of all, the Air Quality Management District will have a hard time warning people ahead of time which nights are a "no light" night. Not everyone watches the 6 o'clock news with bated breath. Second of all, what's to stop the AQMD from arbitrarily declaring a "no light" night for the heck of it?

Third and equally important, who will be enforcing this law? The police? It's not as if they already have enough to do. Especially in a neighborhood where it takes eight minutes for police from the outpost down the street to respond to a 911 robbery-in-progress call. Worst case scenario, it's the coldest night on record, below 30 degrees, it's been declared a "no light' night and the power goes out. What are the police going to do, go house to house and ticket everybody trying to keep warm? Let the senior citizens who chose to freeze rather than pay the $500 fine just die?

I think the AQMD did not do enough research or exaggerated their 30 percent numbers. I live in a quarter-mile 80-acre plot of housing which includes apartments, duplexes and single family dwellings. Eighty percent of the buildings have fireplaces, but not even 30 percent of those residents ever use their fireplaces!

Let's say every building that has a fireplace lights up; it would take the police at least four to six hours to stop at every house and write a ticket - four to six hours they could be catching thieves, helping out at medical emergencies, car accidents, drug busts, rape and molestation calls, family problems and the like.

Putting an all-out ban on using fireplaces is just plain stupid and does not properly address the real problem, which is the 30 percent increase in population in the Central Valley with a more than 50 percent increase in the amount of motor vehicles in the last five years. It also does not prevent the burning of agricultural fields or ban fires. And what about accidental fires? Are accidental fires going to be fined as well?

No light should remain voluntary, not a law. What about barbecues?

Yvonne C. Holt

Merced

Editor: I agree with the letter in Monday's Sun-Star that vehicles contribute much more pollution than fireplaces. I also think the orchard burning contributes more than thousands of fireplaces. On

Nov. 26, my wife and I drove to Southern California on Interstate 5. After leaving Los Banos we observed numerous brush piles on both sides of the freeway that were being burned.

It was a burn day so I would assume the growers had permits. It was also partly cloudy. However on Nov. 30, when returning to Atwater, it was very overcast and raining off and on. As we got closer to Los Banos the pollution was so thick one could hardly breathe . The smoke was so thick you could hardly see the orchards. I would expect it was a no burn day but the fires started several days ago were still alight.

Some of the brush piles burn for a week or more. When the inversion layer locks the Valley in and the huge burn piles are still alight, all of the fireplaces in the Central Valley could not put out that amount of pollution. The Central Valley needs to go back to chipping the orchard prunings, restart the biomass plants and make electricity to sell.

If there are more prunings than the plants could use they could be ground into mulch and sold to consumers for the gardens and flower beds to replace soil nutrients. Cities and counties could use them around parks and buildings. Fireplaces are not the main problem. Vehicles are a big problem but large numbers are exempt and others have waivers from the smog test.

Harold Bagdonas

Atwater

Letters to the Editor, Fresno Bee, Dec. 12

Forest 'attack'

By R. Brett Matzke
Public Lands Director, California Trout Inc., Coarsegold
(Published Thursday, December 12, 2002, 4:53 AM)

Your Dec. 5 editorial on the "Stealth forest policy" is right on the mark. Having worked in the environmental field for many years, I have ridden out the storm of the James Watts years and now watch as this administration sends us backward to before the Nixon era.

What makes this so sad is that most of the changes that are occurring are done behind the scenes using administrative tactics and not allowing the public to comment on any of them.

Now that the Clean Water and Air acts are gutted, our forests and natural resources are next in line to be raped. I use strong language because this administration has forgotten what the term "public trust" is all about.

The public needs to tell this administration that we will not tolerate this stealth attack on our heritage. Let our representatives know how you feel. Without our voices, it will only get worse.

I used to like to quote this Zane Gray passage about safeguarding the environment from over-zealous individuals and corporations, but now I believe it is the government that should be stopped: "Millions of men exploit what is not really theirs for their own selfish ends. Coal, oil, timber, minerals, water ... are all natural products of our great outdoors. I do not advocate that they should belong to the government, but the government should see to it that the men dealing with those resources should not gut them and not spoil the beauty and health-giving properties of the forests and rivers."

Clearing the Air, A series of articles that ran in the Visalia Times-Delta, December 14-16, 2002

Everyone agrees the air in the Valley is bad, but beyond that facts and solutions are murky

Rapid growth causes Valley pollution, but there is no rapid solution

By Justin Stoner, Staff writer

About the only thing the farmer, environmentalist and government regulator can unconditionally agree on when it comes to air quality in the Central Valley is that it's bad, and it needs to get better.

Beyond that, the discussion gets hazy.

There's plenty of finger-pointing in board rooms and courtrooms over who should have done what sooner or better.

Environmentalists want strict controls enforced now and want to eliminate exemptions for some aspects of farming.

Farmers and industry leaders want better science to identify the source of the pollution and who should shoulder the burden for most of the cleanup.

Regulators want common-sense rules and consistent standards that will make it easier for everyone.

Often lost in the debate are the gains made throughout the state and Central Valley toward cleaner air. Ozone levels are down on average, as are levels of airborne particles, even though the population is growing and traffic through the Valley continues to rise.

"We have fewer days exceeding state [ozone] limits with more people and more automobiles," Tulare County Supervisor Bill Sanders, who also sits on the San Joaquin Valley Air Pollution Control District board.

"We are winning. If that weren't the case, our air would be 10 times worse."

Still, there's room to question whether enough is being done to hasten the day Valley residents breathe easier.

In a community where the soil is the backbone of the economy, should someone have foreseen the effect it would have on air quality?

As the quickest route between two of the largest cities and ports on the West Coast, should someone have predicted the vast amounts of smog caused by pass-through motorists?

In this arid climate with bowl-shaped geography, should someone have realized the potential for this area to become the world's largest Petri dish for ozone?

Then again, there's also room to question whether the air here is as bad as it is portrayed.

In the 11 years the San Joaquin Valley Air Pollution Control District has worked on the problem, the number of days each year this area exceeds stringent ozone limits is down. In the past 11 years, the Central Valley had an average of 119 days a year above the state limit, compared to an average of 149 days a year in the years before that -- a 20 percent reduction, according to the state Air Resources Board.

But even those numbers are misleading. It doesn't mean, for example, that Visalia residents are subjected to bad air more than 100 days a year. In fact, Visalia experienced an average of 43 days a year above state limits during the past 11 years, compared to 64 days above those limits during the same amount of time before that.

Furthermore, no community in the eight-county air district has experienced more than 100 days a year above state limits. So, how do air officials come up with a triple-digit figure?

The air district and the ARB collect data from 27 monitoring sites throughout the air basin, including one on Church Street in Visalia. Some are located where one would expect ozone and other measurements to be high. A few, such as in the national parks, are where one would expect levels to be low.

Each day that ozone levels exceed .09 parts per million at any one site, that occurrence counts as a violation day above state limits for the entire air basin.

If two sites on the same date record levels above the limit, the violation still counts only as a single day for the air basin. The year-end total is derived by adding up the separate days above state limits from around the air basin.

But most people don't gauge air quality by what the air district tells them. They judge it by whether they can see the mountains or how the air affects their breathing.

It's the latter measure that causes the most concern. There is tale after tale of families fleeing the Valley because of the effect the air had on their health.

Studies show ozone exposure wears at the lungs, aggravating respiratory conditions -- some say causing asthma. Also, airborne particles lodge in the airways and can bring on asthmatic attacks.

But there is evidence to show that Valley air may not be entirely to blame. Monterey County along the coast is nearly identical in population to Tulare County. And although air conditions there almost never exceed state or federal limits, Monterey County reports virtually the same number of asthmatic attacks in children and other respiratory ailments in adults, according to the American Lung Association.

Central Valley vs. Los Angeles

No one would mistake Visalia for Los Angeles, or vice versa. Still, there are constant comparisons between the South Coast air basin and the San Joaquin Valley air basin, as if the two were competing for the title for dirtiest air.

While both areas report similar numbers of days in violation of state and federal limits, the factors involved in contributing to those violations are different.

The South Coast air basin is about 12,000 square miles, compared to about 25,000 square miles in the Central Valley, which is the largest basin governed by a single entity.

The South Coast air basin includes about 14 million people while there are 3.4 million here.

There, the weather is milder with occasional Santa Ana winds and a climate affected by the sea. Here, the mountainous geography stagnates the atmosphere with baking summers and fog-covered winters.

The South Coast basin has worked on its air quality for nearly 50 years. The coordinated effort here didn't begin until 1991.

Other differences

But there are more substantive differences hidden in the volumes of data collected and analyzed by state regulators.

During the past several years, the number of days the South Coast air basin and the Central Valley exceeded state standards for ozone are virtually identical. But lost in those generalizations of "bad air" days are actual measurements of ozone concentrations that tell a slightly different story.

The average maximum ozone concentration for the Central Valley over an 11-year period was .163 ppm -- nearly double the state limit.

The average maximum ozone for the South Coast basin over that same 11-year period was .235 ppm -- nearly triple the state limit.

Part of the Central Valley's air problem is its rapid growth in the past 20 years. A report by the ARB says the urban areas that make up the eight-county air basin grew faster than other urban areas in California, growing from 2.1 million people to 3.2 million between 1981 and 2000.

Also, the number of vehicle miles traveled through and around the Valley more than doubled during that time from 35 million miles per day to 82 million miles per day, according to the ARB.

"This represents a 136 percent increase," the ARB report said. "Because these growth rates are so much higher than the growth rates of other areas, there has not been the same level of air quality improvement in the San Joaquin Valley air basin, especially with respect to ozone."

That rapid growth and moving masses is gaining more attention from Central Valley air district officials. The air district lacks the authority to regulate mobile sources of air pollution, such as vehicles, but it can focus on residents.

"The awareness level is rising within the public about air pollution, and that's not by accident," Sanders said. "You're seeing more local advocacy groups made up of some business and industry, who don't like the regulations, and want a broader participation so all of the onus of clean air doesn't fall on them."

The Valley's bad air leads to the Valley's bad health

Study of pollution's long-term effects to be released next year

By Mike Hazelwood, Staff writer

Ireland Green's words -- innocent as they seemed -- sliced through the air, reaching her mother's ears as a grave warning.

"I can't chase boys around school any more," she told her mother at about age 5, "because it makes my chest hurt."

Wendy Green, who lived in Hanford at the time, believed her daughter's health was suffering at the hands of a monster looming over the Valley -- air pollution.

She had reason to worry, experts say.

Air pollution kills from 50,000 to 100,000 Americans a year and is second only to cigarettes in causing lung disease, according to the American Lung Association.

Valley residents are trapped in a box with air pollution, as mountains on three sides keep the air stagnant.

Constant exposure to air pollution can cause chronic health problems, such as damage to the body's respiratory and immune systems, according to the Environmental Protection Agency.

While there's no scientific evidence to support widespread claims that air pollution causes asthma, the EPA says, it can make existing respiratory conditions severely worse, especially in children.

That's why things seemed so bad for Ireland Green, who was diagnosed as a borderline asthmatic.

Her mother, Wendy, who moved from Sacramento, said her own breathing problems began after she moved to the Valley seven years ago.

Making matters worse for the Greens, Wendy and husband, Curt, had four more children to worry about, all younger than age 11.

So four months ago, the Green family stood up to Valley air pollution and made a change that would wrap them in a new sense of security. It was a breath of fresh air, one might say.

The Greens moved to Utah.

"You can take a deep breath and you just smell ... air and nothing else," Wendy said about Utah. The family's health improved almost immediately, she said.

Effects

Dr. A.M. Amenian, who specializes in the respiratory system and has practiced in Visalia for about 16 years, said he sees effects of Valley air pollution in his patients nearly every day.

"People may believe that they are suffering from typical allergies, which sounds good because of all the [agriculture] in the area," he said. "But many times what they are suffering from are [pollution] particles."

About 25 percent of visits to general practitioners in the Valley are linked to air quality, according to estimates from the San Joaquin Valley Air Pollution Control District.

The symptoms vary.

Irritated eyes, noses and throats. Congested heads and chests. Hacking coughs. Chronic fatigue. The body isn't getting enough good, clean oxygen, experts say.

"It's like a car that doesn't get enough fuel," Amenian said.

Air pollution is usually broken down into two major parts: ozone and particulate matter. Ozone is a poisonous gas that forms from other airborne chemicals, most of which can be tied to vehicle exhaust. In the human body, ozone can burn through cell walls in the lungs and airways. Cell tissue becomes inflamed. The lungs and airways become swollen and congested, making it harder to breath, among other problems.

Particulate matter consists of small particles that can come from agriculture, construction, wood burning and other sources. Particles can evade the body's filtering system in the nose and throat and reach the lungs, where they can become lodged.

Overall, air pollution weakens the lungs' defense against contaminants.

For those with existing lung problems -- including asthma, emphysema, bronchitis and others -- that added stress can led to more attacks.

Children

Many environmental groups and watchdogs claim that air pollution can actually cause asthma, but according to the EPA, there is no conclusive scientific data to support that claim.

However, in 2003, researchers at the University of Southern California are expected to release results from what is widely considered to be the most comprehensive study to date of air pollution's long-term effects.

The $16 million study, which began in 1993, follows 3,500 children from 12 different Southern California communities, monitoring their health and activities over a 10-year-period.

Overall, it appears air pollution makes children more vulnerable to respiratory illness and may result in weaker lungs as adults.

The study is pertinent in the Valley because Southern California and the Valley report similar numbers of days in violation of state and federal air quality standards.

Though the entire USC study won't be released until next year, researchers have released portions of their findings along the way.

According to USC researchers, children growing up in areas of high air pollution:

· Are three times more likely to develop asthma and up to four times more likely to develop the respiratory illness if they are active in sports.

· Have lung function that grows at a 10 percent lower rate than children in low air pollution areas. This is especially true of girls.

"Children need more oxygen than anyone else," said Amenian, who is not involved in the USC research. "But their respiratory tract is often not mature enough to adjust to pollution."

Adults

For some adults, Valley air not only irritates the body, but also the mind and way of life. Constant irritation can be, well ... irritating.

"It's like a perpetual itch in the middle of your head and, no matter what, you just can't reach it," Green said.

For those who reach out to doctors, the advice they receive is often hard to swallow. It involves changing how they live their daily lives.

· Exercise can be unhealthy. Jogging or playing a sport outdoors, and breathing in gallons of polluted air, just doesn't have the health benefits they used to.

· Stay indoors as much as possible, especially on days that the air district deems as unhealthy or hazardous.

· It may be cold, but avoid the temptation to use a fireplace or wood-burning stove. That only adds to the problem.

· Avoid traffic jams. Find ways to travel other than in automobiles or postpone trips until less hectic times of the day.

Anna and Nathan Crockett of Visalia, who have three boys ages 2 to 9, remember taking their children to the doctor because of breathing problems that were ultimately linked to bad air.

For parents that financially survive in the Valley's strong agricultural industry, the medical advice they received put them in a tough position.

"We went to the doctor," Anna said, "and he told us that we just need to move."

The Crocketts decided to stay in the Valley.

Their children use a combination of medication and breathing devices -- plus a lot of time indoors -- to stay healthy.

'Welcome back'

The Green family now breathes in Layton, Utah, seemingly a world way from their old home in California's Central Valley. The sky is a brighter shade of blue. The air is crisper and seemingly cleaner. The view of the mountains isn't hazy. Their violent coughing fits and troubled breathing are gone.

Wendy Green returned to Tulare County in October on a work-related trip. Not much had changed, she said.

"As soon as I pulled into the Central Valley, the elephant stepped on my chest," she said. "I couldn't breathe."

Constructing a Catastrophe

As the Valley grows, so does the construction industry -- and so do pollution levels

By Melinda Morales, Staff writer

Tulare County depends heavily on automobiles for mobility, the construction industry for housing and agriculture as the dominant job-producer. Yet all three are under pressure in the battle over air pollution in the Valley. These stories look at the forces that could change the way we get around, live and work in the cause of cleaner air.

Valley air regulators point to the construction industry as a major source of particulate matter -- basically dirt, dust, soot and smoke -- that helps foul the air we breathe.

Forty percent of the particulate matter, called PM10, in the Valley's air comes from farming operations and the construction industry, according to the San Joaquin Valley Air Pollution Control District.

While not ready to flatly deny construction's responsibility, the industry is skeptical.

"The assumption is that if dust goes into the air, PM10 does, too, and that PM10 levels are higher between October and February," said Bob Keenan, executive director of the Building Industry Association of Tulare and Kings Counties. But construction activity declines, he said, during those months.

Worse, Keenan says that measures aimed at cleaning things up are shortsighted.

"They want us to use tens of millions of gallons of one scarce resource to keep another resource clean," he said. Now, builders hire water trucks to spray job sites to keep the dust down.

Moreover, Keenan said, the industry as a whole is waiting for studies of air pollution that will determine whether PM10 is, in fact, in dust.

Water

Developer Brian Ennis calls the situation a Catch-22.

Ennis Homes of Porterville, like all commercial or residential land developers, spends a lot of time and money trying to keep the dust from flying, literally, across his many projects. He said the expense involved with keeping the dust down is one that just gets passed on to the consumer.

"If you add everything up, it probably costs $250 per lot in additional expense, which will equate to about $500 to a homebuyer," he said.

Galante Bros. Excavating in Visalia is a contracting firm that specializes in grading and paving work. Galante uses three water trucks to keep the ground on its job sites damp and the dirt on the ground.

"We work in a lot of areas where there are already homes, and we make every effort [to minimize dust], but the neighbors still complain," Fred Galante said.

When, where and how much water is used varies from one job site to another and on the soil and wind conditions on a given day.

Galante's trucks hold between 3,500 and 5,000 gallons of water. He said one truck can deliver 20 to 25 loads of water each day, covering a 20-lot residential subdivision, or roughly 5 to 8 acres, per day.

Contractors like Galante pay the city for the privilege of filling their trucks from city hydrants. Construction meters are attached to the hydrants to measure the water as it flows into the trucks.

To get a sense of how much water the construction industry uses to combat dust, daily use numbers are helpful.

The average person in Visalia uses 260 gallons of water each day for bathing, cooking, cleaning and drinking, according to the Visalia office of the California Water Service Co. Collectively, then, the city uses 24,240,840 gallons in a single day.

In 2001, the most recent year for which complete annual figures exist, 48 construction meters were issued by the city of Visalia that used 34,251,668 gallons of water, according to Phil Mirwald, district manager for CalWater's Visalia office.

That's about as much water as the residents of Visalia use in a day and a half.

And Visalia is just one city in the eight-county area that the Valley's air district monitors.

That said, it must be noted that the construction industry uses water not only for dust control but also for compacting, grading and excavating work.

Opacity

Another facet of the dust issue for builders is that of opacity, a measure of how much dust and PM10 obstructs the view. Visible dust emissions, the air district's term for dirt that flies, must not limit visibility by more than 20 percent during times when the soil is being disturbed by equipment, traffic or just plain wind.

The district trains its enforcement staff to judge opacity.

"They are trained to view and understand how much smoke, for example, is coming from a stack based on a visual assessment," said Josette Merced Bello, spokeswoman for the district in Fresno.

It's an admittedly discretionary process.

"They said you can be trained to do this, to learn how to look at dust and know what percentage of opacity there is, but it's pretty much subjective no matter how much training you have," BIA's Keenan said.

And for those who violate the 20 percent opacity rule, the penalties are subjective as well.

Ted Strauss, with the Valley air district, told a group of local builders and developers recently that fines would be dependent on the type and size of the operation.

Violations are normally the result of complaints by individuals to the air district, Strauss said.

"A complaint doesn't necessarily mean a fine is coming, it just provides the district with a reason to inspect the area further," he said.

Runoff

While keeping the dust down by using water may ultimately make the air cleaner, it also contributes to the runoff that accumulates and gets swept through the city's storm drains.

Builders say there's a fine line between putting enough water on the ground to keep the dust from flying and so much water that it creates runoff.

"We've got the air board on one side and the storm water waste prevention agency on other side," Ennis said. "They want us to minimize water waste as much as possible to keep it from going into the storm drain system."

At present, stormwater discharge limits on construction sites are more self-policed than anything, said Jim Ross, the city's public works manager.

"Within next year, the regulations will get more stringent," he said.

Those regulations, which are designed to prevent sediment, dirt, oils and chemicals from getting into canals and rivers, are scheduled to take effect early in 2003.

Now the city places a semicircle of tightly rolled straw at the mouths of city storm drains to prevent debris and chemicals from getting in. They are visible along Highway 198 which has steep embankments susceptible to runoff.

Keenan said preventing runoff will be another major concern of the building industry.

"We had the option of using chemicals, but that created another question. Wouldn't the amount needed ultimately have a build-up that would percolate into the water supply?" he said. "How many mistakes do you have to make?"

Regardless of what regulations will be enacted or strengthened to control dust and improve the quality of the air in the Valley, builders say they will have a hard time satisfying anyone.

Mitchell Brown, who owns a construction company in Porterville, scratches his head.

"They don't want it up in the air or down in the ground. There's no middle ground for the middle guy," he said.

County's vehicles may lead to sanctions

By Dan Martin, Staff writer

Air pollution in Tulare County has many contributors, but one stands out: the tailpipe.

Tailpipes of autos, light trucks, heavy trucks, diesel trucks, school buses, motor homes and even boats emit gases that result in the formation of smog.

Motor vehicles are, in fact, responsible for most of the smog problem, said Josette Merced Bello, a spokeswoman for the San Joaquin Valley Air Pollution Control District.

"As a rule of thumb, about 60 percent of our smog comes from what we call, collectively, 'mobile sources' -- all of those things that have an internal-combustion engine," she said. "About 40 percent is caused by business and industry."

For years, the smog has impeded the Valley's compliance with the ozone standard in the 1990 federal Clean Air Act.

The standard is set at .12 parts per million; the Valley has violated the standard every year since the act took effect, Bello said. In 2001, the Valley failed to meet the state standard on 123 days, she said.

As a result, motor vehicles -- 286,524 of them registered in Tulare County alone -- carry the potential to bring federal sanctions for noncompliance, along with health effects on the population, Bello said.

The federal government could not only make it harder for job-creating industry to locate or expand here but could freeze an estimated $2.2 billion in highway-project funding that's in the pipeline for the Valley, Bello said. It could also conceivably take over the battle with pollution.

"You want to talk Draconian?" she said. "They have the power, where we don't, to implement things such as no-drive days or to shut down businesses."

The problem

Automobile-caused air pollution has been around since at least the 1940s, said Sam Atwood, a spokesman at the Los Angeles-area South Coast Air Quality District who helped write an essay on the history of smog.

"It's fair to say that after World War II, when freeways started getting built and when the number of cars started proliferating, the vehicle contribution to smog started to grow and approach, if not equal, that from industry," he said.

Smog is the sometimes-brownish, sometimes-grayish haze often visible on the horizon. It's a blend of nitrogen oxides, which can be seen, and ozone, which is a clear but unhealthful form of oxygen in clusters of three atoms.

Prolonged exposure to smog has been shown to trigger asthma symptoms and cause scarring of lung tissue, according to the U.S. Environmental Protection Agency.

Sunlight reacts with tailpipe emissions to create ozone -- and enough of it to violate Clean Air Act standards. Within Tulare County's boundaries, vehicles emit a daily average of 16.1 tons per day of the "reactive" gases that help cause smog.

Ironically, ozone is crucial in shielding the planet from ultraviolet light, but it serves that function in the ozone layer, roughly 20 miles above the planet surface.

Vehicles in Tulare County also emit 160 tons each day of carbon monoxide and 28 tons each day of nitrogen oxides, though not enough of either to violate Clean Air Act standards. The numbers are daily averages based on a year's worth of data from the California Air Resources Board.

The solution

It's not that people don't think the smog is a problem. They do, according to a report from the Great Valley Center, which studies the social, economic and environmental health of the Valley.

About 64 percent of Central Valley residents are concerned about the environment's effect on health, up from 55 percent in 2001, the report, released in April, said. Meanwhile, 83 percent of residents consider air pollution a problem, with 39 percent calling it a big problem, up from 31 percent in 2001.

It's just that solutions have been out of reach.

For example, one modification made to cars involves recirculating exhaust gases into the engine for combustion, lessening the amount of nitrogen oxides produced. Catalytic converters, too, have contributed to a slowing of emissions increases.

There has been an effect. In 1987, the Valley violated the federal ozone standard 156 days. In 2001, it violated the standard 123 days.

And today's cars typically emit 70 percent to 90 percent less pollution over their lifetimes than their 1970 counterparts, according to the Environmental Protection Agency.

Yet the ozone remains.

"It's not going to go away any time soon," said Richard Varenchik, a spokesman for the California Air Resources Board. "There're too many people."

Too many people driving, that is.

In 2001, there were 286,524 vehicles registered to Tulare County addresses, up from 238,035 in 1990 and 205,990 in 1980.

There's no telling where they're being driven. But for an example of traffic volume, 40,000 vehicles on Highway 99 pass Avenue 280 every day. Some 83 million miles are driven in the Valley daily.

Giving it time

A drastic improvement would be seen if all cars were fully electric, many think.

Some electric cars have been around since the late 1990s, Varenchik said, in addition to "hybrid" cars that operate on gasoline and electricity. Hybrids may emit 60 percent to 90 percent less pollution while fully electric cars don't emit any.

At the moment, the fully electric cars can go about 150 miles until charging is needed, he said.

"I've driven some of them for two or three weeks in a row," Varenchik said. "It was just like driving any other car, except I had to plug it in at night."

He also that the Air Resources Board is urging auto manufacturers to continue the development of those cars so they'll become an attractive option to consumers and eventually outnumber vehicles with tailpipes.

That scenario is years off, though, because the cars don't have the stamina of gasoline-powered cars, limiting demand.

Which means the smog will remain until some solution is found. While that's admittedly hard, Richard Cummings, a spokesman for the Great Valley Center, says the solution must be more aggressively sought.

Lots of hot air

Vehicles are responsible for an estimated 60 percent of smog. Here's a count of how many vehicles have been registered in Tulare County over the years.

1960 97,041

1965 118,698

1970 137,000

1975 167,156

1980 205,990

1985 221,328

1990 238,035

1995 262,330

2000 277,624

2001 286,524

Source: California Department of Motor Vehicles

The increase in vehicles passing on Freeway 99 at Avenue 280, has also climbed.

1960 12,800

1970 22,800

1980 24,900

1990 36,000

2000 37,500

2002 40,000

Source: California Department of Transportation

Farmers struggle to 'do their part'

Growers say they're doing more than ever to help clear the air; is it enough?

By Amee M. Thompson, Staff writer

There's no arguing that farmers kick up dust, burn prunings and have cows that emit gas.

Their critics call farmers the worst polluters in the Valley and say they get away with it without fine or regulation. Farmers say they have cleaned up considerably and are being held accountable for the pollution they create.

Regulators are somewhere in the middle -- sometimes regulating the industry and sometimes exempting it.

It is hard to quantify how much pollution farmers are responsible for because of the cars and trucks moving through the Valley and the geography that locks everything into this bowl, said Cynthia Cory, director of environmental affairs for the California Farm Bureau Federation.

"I'm not saying that we don't have responsibility," she said. "But there are a lot of things that ag has done and will continue to do to clean up the air."

Environmentalists, on the other hand, have an easier time quantifying agriculture's effect on the air. Between nitrogen oxides from irrigation pump engines and volatile organic compounds from dairies, environmentalists say agriculture is a major cause of air pollution in the Central Valley. Nitrogen oxides and volatile organic compounds react in sunlight to form ground-level ozone, the main component of smog.

"No matter how you look at it, agriculture plays a very major role," said Kirsten Tobey, a research associate for Earthjustice, an environmental group that sued the federal Environmental Protection Agency over ag's exemption from several air regulations.

But farmers argue that as more people move into the Valley, farms are accountable for a smaller proportion of the problem.

"We've got more than 3 million people here, and in 2020 they are predicting 9 million," said Manuel Cunha, president of the Nisei Farmer League. "Farmers can stop discing all their fields, and we still would be at nonattainment."

Operation permits

Forced by Earthjustice's lawsuit, the EPA ruled that agriculture must comply with the federal Clean Air Act, from which the industry has been exempt for years under California's Health and Safety Code. Now farmers of large agricultural operations that emit "major" amounts of air pollution will have to obtain operating permits, just like large factories.

The EPA defines "major" amounts of air pollution as 50 tons a year or more of volatile organic compounds or nitrogen oxides or 25 tons a year or more of a combination of hazardous air pollutants.

Businesses obtain permits for a certain level of air pollutants. If they exceed their allowable level of pollution, they can buy extra credits from businesses that are emitting less than their permits allow.

Dairies, feedlots and other farms and ranches that operate large stationary diesel engines or have a lot of animals will have to comply with the new rule.

The California Farm Bureau Federation has appealed, claiming that ag should continue to be exempt until more research can be done.

Farmers say they are already regulated on a number of fronts, such as pesticide regulations and burn permits. Their argument is: Why not take information from areas already regulated instead of creating more paperwork?

"Farmers know that they need to be a steward of the land; we all need to do our fair share," Cory said. "How can we accomplish this without all the bureaucracy?"

If the regulation is backed up by good science, then farmers are doing it, Cunha said.

"You can't ask a farmer to come up with a negative number," Cunha said. "I think our farmers are being very responsible."

Both point to the Carl Moyer program, which has helped farmers replace about 2,000 older engines with new clean-burning ones. The program pays about 70 percent to 75 percent of the new engine cost, while the grower picks up the rest. However, the state's $21 billion deficit might mean programs like the Moyer program will be lost.

Earthjustice's Tobey said keeping agriculture exempt does nothing but continue to hurt air quality in the Valley.

"There's this sort of common phrase in the Valley which is: 'Everybody has to do their part,' " Tobey said. "You hear farmers saying it as well as industrialists and others. That's just lip service if you are saying everyone has to do their part and then you're just asking for exemptions right and left."

She said the rules have to be on the books, and then they need to be enforced.

"You can't have one without the other," Tobey said. "And they need to be enforced by the agencies themselves. Too often individuals have to step in."

Burning

For ages, the easiest way to get rid of the prunings from fruit and nut trees was to burn them. For more than a decade, permits have been required before farmers could burn. Now even with permits, farmers can burn only on designated "burn" days. Next year, farmers will be able to burn only a specified amount of a certain material on any one specified day.

"We're looking at it in a much more sophisticated way," Cory said.

She said a large problem with burn days now are that farmers store up what they have to burn and then burn it all at once when the San Joaquin Valley Air District designates a "burn" day.

Allowing only so much to be burned on one day will help to relieve the smoke impact of burn days, Cory said.

"There will be more days, but they will be more restricted on who and what can burn," she said. "That will be an improvement that people will see in the Valley."

Farmers who burn illegally can face a minimum of a $600 fine a day, said Gary Martin, San Joaquin Valley Air District mutual settlements coordinator. But that's just for a basic violation. Depending on what is burned and for how long, the fines can go up to $25,000 or $50,000 per day, Martin said.

"It's a case-by-case basis," he said.

Tobey said the permits are effective as long as they are enforced, but there are too many times when she hears about the air district turning a blind eye.

Along with more burning regulations, Cunha said more farmers are also turning to chipping the material rather than burning it.

"A lot of tree fruit and vineyard growers are incorporating the prunings back into the orchard as organic material," Cunha said.

However, chipping costs more than burning.

"It takes energy to chip. You have to have fuel, and you have to get all the prunings in one place and then you have to do something with all the chips," Cory said. "Whenever you are using energy, that means money."

PM10

A buzzword of sorts, PM10 is the latest matter to be regulated by the EPA. It is the fine dust that can be seen swirling around fields as they are being harvested and hanging above a walnut orchard that has just been shaken.

It's dust, farmers argue, that has been there for years. In 1992, agriculture, construction and oil producers teamed up with the EPA and the California Air Resources Board to study PM10 at a cost of $31 million.

Ten years later, the research from that study is still being compiled and probably won't be ready for another six months.

But some tangible changes have already come out of the study, Cunha said.

For example, he said, by changing the direction in which air comes out of the machinery used for almond harvesting -- shifting it from blowing into the ground to having it come out the side -- helped cut the amount of dust. In addition, spreading the trail of matter left in the middle of the row after harvesting helps to prevent it from being stirred up the following year.

"[The research] has helped us do a better job in orchard management," Cunha said. "We would have never known that unless we did the research.

"But to tell farmers to do things that we don't know will affect the amount of PM10s is not going to work."

Brent Newell, an attorney for the Center on Race, Poverty and the Environment, represents two Central Valley groups seeking to enforce environmental rules on airborne particles.

"There is an exemption for agriculture when it comes to fugitive dust rules," Newell said. "That is a fundamental flaw, because it is the dominant activity and it's important that we are all part of the solution."

He said the bulk of all airborne particles come from farming, either by working the soil or via organic sources.

"For example, dairies emit half of the ammonia in the Valley. It combines with other molecules in the air to become ammonium nitrate, which is a dominant particulate matter in the air."

Dairymen say it's too expensive to use equipment to catch the gases that come off lagoons, which are the basins where animal waste is collected. However, it is an option that may come into play more as dairy regulations get tougher.

"This is new," Cory said. "It's new for everybody, for the regulators and for the farmers. We are willing to be players and see who best could step up to the plate. But don't do it overnight."

What's the problem with the Valley's air?

Merced Sun-Star, December 13, 2002

The San Joaquin Valley Air Pollution Control District is charged with cleaning air pollution from Bakersfield to Stockton.

The Central Valley's air currently fails to meet federal Clean Air Act standards for two different pollutants.

Nitrogen oxide emissions - created mostly from vehicles - form ozone pollution, also called smog, in the summer months.

In winter months, tiny-particle pollution is the problem. It comes from wood burning, dust and diesel engine emissions.

Agriculture creates an average of just under 10 tons per day of particle pollution.

Residential wood-burning creates an average of just over 12 tons per day of the pollution.

The Valley air district has authority to regulate industries, agriculture and residents but no authority over vehicles.

The air district is governed by an 11-member board, made up of city councilmen and county supervisors from throughout the Central Valley.

SUN-STAR STAFF REPORT

Madera supervisors reject Valley group

Some members leery of ties to environmentalists.

By Charles McCarthy, The Fresno Bee, December 13, 2002

MADERA -- The Madera County Board of Supervisors refused this week to join a movement aiming to improve social, economic and environmental conditions in the San Joaquin Valley.

Four Valley counties -- Kings, Kern, Tulare and Fresno -- have joined The San Joaquin Valley Resource Conservation & Development Area, which strives to "educate the folks in Washington, D.C., how important this Valley is," said acting coordinator Noreen McDonald.

Merced and Stanislaus counties were expected to sign on. Eleven resource conservation districts, two American Indian tribal governments and seven organizational members at-large have also joined.

Supervisors voted 3-2 against the proposal, which would have made them members of a steering committee.

The group's goal, McDonald said, is to obtain federal funding for "using natural resources to create economic opportunity." For example, the group has plans to employ farm laborers in the agricultural offseason to clear plantclogged streams and rivers.

One board member balked at cooperation with environmental groups. Supervisor John V. Silva said he had "been to too many wars already with these environmental people."

"We had a three-hour meeting yesterday on an elderberry bush that we can't deal with," Silva said about wildlife habitat. "I'm tired of the environmental community. It's become the government and it's not of the people ... bureaucracy on top of bureaucracy."

Supervisor Gary Gilbert warned that under present economic conditions, "the grant pool is drying up." He saw the new plan as forming just another organization.

With not-so-fond memories of the recent Enron/Azurix project to fill a water bank under 13,600 acres eight miles southwest of Madera, board chairman Frank Bigelow questioned the group's mention of underground storage to ease water shortages.

Supervisor Ronn Dominici is Madera County's delegate to the San Joaquin Valley Air Pollution Control District. He argued that anyone pushing for air and water quality would help the Valley.

Supervisor Vern Moss suggested that Madera might be better off joining a Valleywide effort. "If we stand alone, totally, then we're not going anywhere," Moss said.

After the rejection, McDonald said the group will keep going "one member short."

The reporter can be reached at

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Autry seeks aid at Capitol

Ideas range from air cleanup tax credit to help for volunteers.

By Michael Doyle, Fresno Bee Washington Bureau, December 13, 2002

WASHINGTON -- Fresno Mayor Alan Autry brings his charm offensive to the capital this week, seeking federal help on everything from clean air to citizen volunteers.

Some ideas loom large, like a regionwide tax-credit proposal for aiding San Joaquin Valley air pollution cleanup. Other ideas are as discreet as a federal grant, perhaps to boost Fresno's highly regarded Citizen Corps volunteer initiative.

And on an entirely more social note, Autry and his wife, Kimberlee, attended an evening Christmas party at the White House.

Taken together, the package he's presenting today to White House officials reflects Autry's intense interest in boosting Fresno's visibility and tapping federal resources. Of which there are many, at least potentially.

"Everybody is competing harder for less these days," Autry said. "To be disconnected [from Washington] now is municipal suicide."

On Thursday morning, for instance, Autry spent considerable time with the Environmental Protection Agency's top air pollution officials. His big anti-pollution idea mirrors the economic enterprise zones established during the Clinton administration.

Designated regions, now dubbed empowerment zones and currently including Fresno and Santa Ana, can benefit from special tax credits, tax deductions, grants and more designed to draw jobs and housing.

With the eight-county San Joaquin Valley consistently having some of the nation's worst air, Autry thinks similar economic incentives could be usefully employed. He's pitching to EPA officials a regionwide effort -- call it, he suggests, an environmental empowerment zone -- that would establish tax credits for clean-air endeavors like encouraging mass transit and retrofitting old vehicles.

"There's just a myriad of incentives," Autry enthused over lunch at the Mayflower Hotel, and "the logical place to start would be a prototype, like in the San Joaquin Valley."

Nonetheless, political obstacles abound for this big idea. Which may be one reason why Autry also was urging EPA officials not to squelch the region's economic development as it weighs future regulatory decisions.

It took Congress more than a decade to create the original economic enterprise zones, from the time Ronald Reagan first proposed them in 1982 to their full appearance in 1993. Time already presses on the San Joaquin Valley, as the region faces federal cleanup deadlines over the next three years.

Enterprise zones are potentially costly. Tax incentives for the various urban and rural economic empowerment and assistance zones cost the government more than $22 billion in foregone revenues.

For all that, Autry and Fresno's paid lobbyist, Len Simon, said they thought a united San Joaquin Valley congressional delegation could move the idea forward, and they insisted that the Bush administration already had a strong "focus" on the Valley's needs.

Simon said he likes to bring Autry back to Washington at least three times a year.

"[Autry's] view is that everyone in Washington is potentially a friend," Simon said. "When he comes here, good things happen."

Even good things, though, can come with a price tag, sometimes deferred.

Simon noted that the Justice Department this year, not long after an earlier Autry visit, approved a $6.9 million Community Oriented Policing Services grant. The money would allow Fresno to hire up to 92 additional police officers over three years. But after that, unless the rules change, the city would shoulder the entire cost of the new officers.

The Fresno City Council last month agreed to accept the money to hire 30 officers this fiscal year.

"I can't not take that money," Autry said, though he added that he remains troubled by the unresolved question of how Fresno will face its future COPS burden if the federal tap gets shut off as scheduled.

Home builders back ban on fireplaces using wood

By Sanford Nax, The Fresno Bee, December 14, 2002

Fresno-area home builders are supporting efforts to improve air quality in the central San Joaquin Valley, endorsing a proposal to ban wood-burning fireplaces in new subdivisions.

The Building Industry Association of the San Joaquin Valley sent a letter to the air pollution control district this week supporting a recommendation to curtail fireplace burning on bad-air days.

The BIA endorsed the proposed ban of wood-burning fireplaces in new subdivisions that don't meet U.S. Environmental Protection Agency standards, and supported the recommendation to require home sellers to replace or dismantle older wood-burning stoves and inserts.

BIA president Jeff Harris said studies show that fireplaces generate up to 32% of the pollutants on days when the air is worst.

In a letter to the air district, Harris said that builders fear that the local economy could be affected if a plan for improving air quality is not adopted.

The federal government is requiring new rules because the Valley missed cleanup deadlines for particle pollution. Such pollution is linked to premature death, chronic bronchitis and other lung problems.

The district's proposals in the rule include a ban on wood-burning devices and fireplaces in new Valley subdivisions, unless the home is being built on a lot one acre or larger. Natural gas heating devices would be allowed in any subdivisions.

In addition, when houses are sold, owners would be required to permanently disable or remove wood-burning stoves or inserts that are not federally certified.

Harris said builders who follow certain clean-air policies will be able to promote their new tracts as "clean air subdivisions" under a BIA program that takes effect next month.

To qualify, builders must install only gas-burning fireplaces or wood-burning devices that meet certain EPA standards, in addition to other requirements. Then, the builders will be able to tout the "clean air subdivision" in marketing materials and other advertising, Harris said.

In reality, most of the new subdivisions will have gas fireplaces because new wood-burning models are expensive, Harris said. "The [traditional] open fireplace will be a thing of the past under the air district proposal we are supporting."

"It's the right thing to do," said Steve Lutton, regional president of Lennar Homes. "Builders need to chip in and do their part."

Lutton added the new gas-burning fireplaces are efficient sources of heat. "They are so easy to use and so good now that they heat up a room in nothing flat."

Air pollution control district officials applauds the BIA's support.

"By building houses that are air friendly, these builders are facilitating people making the right choice," air district spokeswoman Josette Merced Bello said. "They are making it easier for people to make better choices."

An environmentalist said the builders had no choice but to adopt the recommendation. "They could oppose it and it wouldn't make any difference, but I commend them for stepping up and supporting the rule," said Kevin Hall, Sierra Club activist and Fresno County Planning Commission member. "It sends the right message to the public."

Fresno Bee Editorial, December 15, 2002

We can't go on living this way

As the air quality in the Valley has deteriorated, our choices of what to do about it have dwindled to two: We can get serious about the painful task of cleaning the air, or we can all stand around and watch the Valley begin to die.

The task of cleaning up the Valley's filthy air is so immense that it seems hard to know even where to begin. But the answer is really very simple: Begin everywhere. There is no aspect of our lives in this region that isn't touched by the increasingly foul fingerprints of air pollution.

It's a health issue: asthma and other respiratory ailments are rampant in the Valley. It is an especially cruel environment for the kids we say we care about so much; childhood asthma rates are among the worst in the country, and even healthy children are robbed when bad air restricts their activities.

It's an economic issue: Pollution costs us plenty, in lost work because of illness (and higher health costs of all sorts), in damage to crops and in lost opportunities to bring new businesses and jobs to the region.

It's a political issue: The question of what restrictions are appropriate on our behavior - especially in the area of land use and planning - is often decided less on the basis of science than on the thrust and parry of ideological debate, or the baser motive of profit. Several generations of government leaders at federal, state and local levels have abdicated their duty to the public interest.

But they're not entirely to blame. The principal obstacle has been the reluctance - or downright refusal - of much of the public to take the problem seriously. We no longer have that luxury. That's clear from The Bee's massive special report on air quality in today's paper.

It's also clear that the debate can no longer be about whether we have an air quality problem in the Valley, or whether it's bad enough to warrant action. We do, and it is. The issues to resolve are what we are going to do about it and how we will manage the pain that our solutions bring.

And there will be pain. Some of our most cherished notions are going to have to be abandoned. Others will have to be dramatically curtailed. And the cost will be high.

We cannot, for instance, continue to ignore the deadly effects of our decades-old symbiosis with the fossil fuel-burning internal combustion engine, particularly in our trucks and cars. Our cherished convenience may suffer a great deal before we've cleaned up the air hereabouts. But we'll have to learn to live with that.

We cannot allow our residences to be built farther and farther from job centers and urban cores, nor can we continue to spread them out over large pieces of land. Given our enslavement to the private vehicle, that just increases traffic and congestion, which makes the air even worse.

We can no longer tolerate the inequitable state of affairs in agriculture, which enjoys an exemption from pollution regulations that apply to all other businesses. The ag industry is going to have to learn to live without the convenience of burning its trash in open fields, and find new ways to reduce dust and other particulate pollution. In particular, the industry is going to have to find alternatives to the diesel engines used to power irrigation pumps and other farm equipment. All that will raise the cost of food and fiber to consumers, but we'll have to learn to live with that.

Fireplaces can create a cozy and inviting milieu, and in some homes they provide the only heat available in winter. But they also account for a huge fraction of the soot and ash in our wintertime air - and that can be deadly. We no longer have the luxury of using wood-burning fireplaces for ambience or warmth. We'll just have to learn to live with that.

Hair spray and other aerosol products emit ozone. Gas-powered leaf blowers and other yard care equipment are significant sources of pollution. Off-road motorcycles and all-terrain vehicles often produce much more pollution than newer cars. Charcoal grills - and especially the lighter fluid we often use to start them - are pollution sources. All of these, and many more modern conveniences, may have to be restricted or even banned. We'll have to learn to live with that.

There's more. Paints and solvents haphazardly stored in residential garages can be a source of air pollution. Aggressive driving pollutes more than driving slowly and patiently. Free parking for employees at work is a disincentive to carpooling and mass transit use.

One of the impediments to progress against air pollution in the past 40 years has been the distressing tendency on the part of Valley residents to try to shift the blame. We like to stand in a large circle, point at the person on our right, and shout loudly, "It's his fault!" Well, it is his fault. It's also her fault, and their fault, and your fault and ours. We are all part of the problem. We must all be part of the solutions.

And we must begin to apply those solutions right now. We are out of time. This is no longer a matter of dodging some bureaucratic deadline set in Sacramento or back there in Washington, D.C. We've blown all those deadlines - every single one.

This is not about mad scientists shrieking about the sky falling. It's not about Bay Area crud wafting over our heads. It's not all the fault of urban drivers, or Valley farmers, or any other single group. We dug this hole together, we filled it with filth, and we jumped in and tried to pretend that it was pleasant. We can't go on living this way. And we won't.

Letter to the Editor, Fresno Bee, December 16, 2002

Any and all comments

By David Jones
Planning Manager, San Joaquin Valley, Air Pollution Control District

In response to Kathie Gregory's letter [Dec. 10] claiming that the Valley air district excluded public comments, didn't provide adequate information and refused to answer questions during the Dec. 3 workshop on proposed changes in wood burning: More than 70 persons attended the meeting in Fresno that evening, joining 25 others via video-teleconference in Bakersfield and Modesto. To allow everyone an opportunity to speak, the district took a few comments from each location before rotating to another. This arrangement was explained at the beginning of and during the meeting.

Everyone was given the opportunity to comment. The workshop, which started at 6:30 p.m., lasted until 9 p.m. and did not end until everyone who wanted to speak did.

To help residents understand this complex issue, the district provided copies of the planned presentation and a fact sheet with frequently asked questions on this issue at the beginning of the workshop. The information is easy to understand and available on the district's Web site, www.valleyair.org <http://www.valleyair.org> under "News and Education."

District staff also answered questions raised during the meeting or took contact information for those requiring further research. A number of reporters attended, including one from The Bee.

The district will accept public comment on the proposed wood-burning program until Dec. 20. Residents may submit comments via mail to Tom Jordan, 1990 E. Gettysburg Ave, Fresno, CA 93726 or via e-mail tom.jordan@valleyair.org.

Opinion Piece, The Record, December 14, 2002

Duraflame: Let's clear the air on fireplaces

Published Saturday, December 14, 2002

It's time for the public to get involved in the wood-burning regulations process and help clear the air, not only of wood smoke, but the hyperbole and confusion being spread by the San Joaquin Valley Air Pollution Control District and the media about future restrictions.

* **NEWS FLASH:** Residential fireplaces and wood stoves do not produce 30 percent of the Valley's PM 10 emissions during the winter, and laws prohibiting the emissions during the winter, and laws prohibiting the use of your fireplace have not yet been adopted by the Valley air district.

How is it that so many media outlets in the Valley have mis-reported that wood burning in fireplaces and wood stoves creates 30 percent of these emissions? A 1999 California Air Resources Board inventory of all areawide sources in the San Joaquin Valley indicates that residential fuel combustion (fireplaces and wood stoves) only produces about 3 percent of the average daily PM-10 emissions. Perhaps it's because the air district claims that on the worst, high-pollution winter day, residential wood combustion may contribute up to 30 percent of PM-10 emissions. This appears to be based on an emission study from 1995, where during a three-day period, a single emission-monitoring site in downtown Fresno made that recording. Certainly the district isn't advocating mandatory burn restrictions for the entire Valley based on one bad air day in Fresno seven years ago. It is disingenuous for the district to publicly claim fireplaces produce a significant amount of Valley pollution based on very limited, old air monitoring. If the district has more-recent scientific facts to document an ongoing, pervasive wood-smoke problem, we hope they will share this information with the public. Has the media independently confirmed the facts? The media also needs to do a better job of critically investigating the basis for the district's proposals before getting the public stirred into a frenzy.

We are not implying that wintertime residential wood combustion doesn't have some impact. When climatic inversions build in the Valley and hold pollutants closer the ground, residential wood smoke can be problematic. But emissions may not be as bad as the public is being led to believe and may not justify some of the restrictions being proposed. Valley residents have a right to be angry that the district staff is claiming the "proposed" regulations will be mandatory next year. The district still must complete a formal rule-making process that includes public hearings and a board vote. That won't happen until March or April. The public should also be concerned that the district has intentionally overlooked inexpensive and low-emission solutions.

To provide some perspective, Duraflame Inc. recently sponsored an independent survey about fireplace usage in the Valley. We discovered few people would accept the district's recommendations that they convert their fireplaces to new technology at an average cost of $800 to $3,000. A majority were against the district's proposal to dramatically limit traditional, open fireplaces in new homes.

Our study showed that residents are concerned about air quality and support reducing emissions. People in the Valley are open to change and want to do the right thing. They just want cost-effective, practical and less-intrusive solutions. For example, our survey showed that when Valley residents are informed that manufactured fire logs produce two-thirds fewer particulate emissions

than burning wood in fireplaces, 42 percent said they would consider switching to fire logs. We aren't so naïve to think that burning fire logs is the only solution. A change in burning practices on high-pollution days and an eventual migration to cleaner-burning fireplaces and stoves is also warranted. But the research speaks for itself. If the district encourages residents to burn manufactured fire logs, there will be a dramatic, immediate reduction in particulate emissions during winter. If people want cost-effective choices, they should get involved in the debate. They can submit comments in writing by Friday. For more information, call (559) 230-6000 or visit the air district's Web site: www.valleyair.org.

Chris Caron, vice president

Duraflame Inc.

Stockton

Letter to the Editor, Merced Sun-Star, December 13, 2002

Where will it end?
Editor: I am responding to the "Street Talk" question, "Should wood burning in homes be banned?"

Here we go again. The environmental wackos are at it again. They lost the battle over the endangered fairy shrimp, so they have decided to go after people who burn wood in their home fireplaces.

Here is one group - homeowners - who burn wood in their fireplaces, who do not have an organized lobby. These are people who just want to stay warm during the winter months. They are doing society a favor. If they did not burn this wood in their fireplaces what will the orchard people do with all the wood they collect when they remove an orchard? Are we going to ban orchards?

Will the EPA also ban agricultural burning? What is the difference between homeowners with fireplaces burning this wood, or the orchard people piling the trees together and burning them all at once? Won't there be the same amount of pollution created?

Will the EPA also ban burning the stubble from rice fields? Why don't the environmental wackos outlaw dairies, plowing fields, spraying insecticides and fertilizers, automobiles (especially the ones that spew clouds of contaminants from their exhaust pipes), and factories in the county?

This is another example of government (Central Valley air pollution regulators) trying to fix a major problem (air pollution) by banning an activity that produces less air pollution than other causes. Maybe this is being considered because the county's budget has been so low and they feel this is a way to increase the revenue of the county: Fine wood burning stoves users. That should generate a lot of money for the county.

Tom Olson

Le Grand

Letters to the Editor, The Bakersfield Californian, for December 16, 2002

Neighbor versus neighbor

I have this neighbor. He and his family are something else. It seems like every other year he or his wife get a new car -- him a little sports car, her an SUV. He must think he has the best house on the block. He has a gardener, a pool and maid service. He even has some guy come over every Saturday and wash all three of their cars.

Oh, and every weekend at 7 a.m., man, I can set my clock to it. He fires up that Harley and with his wife, off they go. During the summer, it seems every three-day weekend they go off in their motorhome and ski boat. That guy has got to be doing something illegal for a job. He can't make that kind of money.

My neighbor's day is coming. All winter long he burns his fireplace. He has wood delivered three times a winter. In the summer, when he's home he must barbecue every weekend.

I can't wait for that law to pass. I will have that number on speed dial.

People, this is a law designed to put neighbor against neighbor. It's not going to be the fireplace police who drive by and see me burning mine. It will be my neighbor who turns me in. Why? Because we all have that one neighbor who doesn't like something about the way you live your life.

Our government officials know that all too well.

JIM EGGERT, Bakersfield

Letter to the Editor, Modesto Bee, December 15, 2002

Wood-fire control makes sense

If anyone thinks there is no need to control wood-burning pollutants, all they had to do was walk outside on Tuesday. The smoke hung heavy over the valley like a fog.

Having lived in the Rogue Valley of Medford, Ore., and in the Klamath Basin, I can attest to the damage caused by wood smoke from inefficient wood stoves and fireplaces.

Strict no-burn days were implemented and efficient wood stoves were required in all new stoves and homes. They also helped homeowners with no- or low-interest loans to replace wood stoves with new, clean- burning ones. Guess what? Air quality improved to few no-burn days.

It also does not help for users to burn green wood or trash wood.

JIM ROGERS

Ripon