Targeting Smog-Producing Emissions from Pesticides

California was the first state in the nation to identify pesticides that contribute most to air quality problems and to put measures in place to reduce those emissions. In 2006, DPR launched a major initiative to reduce volatile organic compounds (VOCs) emitted by pesticides. VOCs combine with other substances in air and produce ground-level ozone, a component of smog.

Although pesticides produce only a fraction of the total VOC emissions that lead to smog, each VOC source must be part of the air quality solution. Thousands of different pesticide products are used on farms, homes and businesses, a challenge for developing control strategies. DPR has approached the problem on several fronts.

We have funded grants to universities and grower organizations to help them develop alternatives to VOC-emitting pesticides. Alternatives may include products with lower emissions, technologies that reduce the amount of pesticide that needs to be applied, or pest management strategies that require little or no pesticide use.

Reducing fumigant emissions

In some areas of the state, more than half of all pesticide VOCs come from farm fumigants such as chloropicrin and 1,3-dichloropropene. Fumigant pesticides cannot be reformulated to reduce VOCs because the active ingredient is itself the gaseous compound. In areas with severe air quality problems, DPR put regulations into place that limit fumigant emissions by reducing the amount applied and requiring low-emission application methods.

In 2008, the first year of fumigant controls, VOCs emissions dropped significantly. One year does not prove a trend as weather and pest infestations prompt changes in pesticide use. Nonetheless, VOC emissions in 2008 in the San Joaquin Valley declined by an impressive 16 percent from 2007 levels and 30 percent from 1990 levels. Bigger drops occurred in Ventura County and the Southeast Desert. (All three areas do not meet federal air quality standards.)

Nonfumigants the next target

DPR is now turning its regulatory focus to nonfumigant pesticides. Many liquid pesticide products contain solvents, a major source of VOC emissions. Using our authority to require registrants to provide solutions to environmental problems caused by pesticides, we placed nonfumigants into reevaluation in 2005.

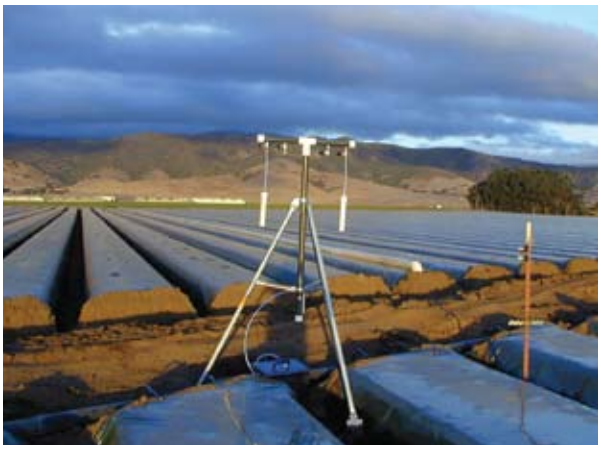
As a result, pesticide makers reformulated several high-use, high-VOC pesticide products, replacing them with low-VOC versions. In 2010, we narrowed the revaluation to products containing one of seven active ingredients that are the highest sources of VOCs, targeting the greatest risks to air quality.

DPR staff wrote a conservation management practices guide that explains ways growers can reduce pesticide VOC emissions. We also created online calculators that can estimate emissions from both fumigant and nonfumigant pesticides. This allows farmers to compare emissions from different products and methods of application.

"DPR's goal is to put restrictions into place by 2014 to reduce VOC nonfumigant emissions," said DPR Director Mary-Ann Warmerdam. "DPR is proud of our contributions to improving air quality while balancing the ability of farmers to carry out changes necessary to reduce pesticide emissions."

DPR PROJECT GETS SPECIAL RECOGNITION

In March 2010, DPR received special recognition from the U.S. Environmental Protection Agency for a U.S.EPA-funded project to reduce VOC emissions from pesticide use in orchard groups in the San Joaquin Valley. DPR's project was lauded in particular for creation of Web-based VOC emission calculators and publication of a conservation management practices guide that explains how growers can do their part to reduce pesticide VOC emissions.


Reducing Air Toxins

Reducing air toxins is a major goal of the air quality initiative DPR launched in 2006. To learn more about pesticides in air and improve protective measures as necessary, we will set up the nation's first network to sample community air for pesticides. Beginning in 2011, DPR will have monitoring stations in two San Joaquin Valley communities and one in the Salinas Valley, sampling regularly over two or more years.

DPR's air monitoring network will sample for up to 34 pesticides and several breakdown products. Pesticides were selected based on use and volatility (both indicators of exposure) and their DPR risk assessment priority (an indicator of toxicity). DPR selected the communities based on several factors, including the amount of pesticides used and demographics related to risk assessment (for example, numbers of children and farmworkers).

Focusing on TACs and fumigants

Under the Toxic Air Contaminant (TAC) program, DPR evaluates pesticides in air and, in cooperation with scientific reviewers, determines potential risks. If we identify a pesticide as a TAC, we work with air districts and others to decide if stricter use controls are needed. In the six years from 2005 through 2010, DPR evaluated and placed on the TAC list sulfuryl fluoride, methidathion and endosulfan. DPR expects to list the fumigant chloropicrin in late 2010.

The law requires DPR to continually evaluate pesticides after they are in use. If we find a pesticide may have harmed people or the environment in normal use, it triggers a reevaluation. Reevaluation allows DPR to require new data from registrants so we can find out the extent of the problems and identify ways to eliminate them. DPR has two fumigants in reevaluation – chloropicrin and sulfuryl fluoride, gaseous pesticides more likely to get into air.

We have also developed stricter controls for metam sodium and other fumigants that produce methyl isothiocyanate (MITC), already listed as a TAC. The proposed restrictions, toughest in the nation, are designed to prevent drift incidents like those that occurred in the early 2000s. The new controls take effect in late 2010.

Reducing toxins with technology

DPR's air initiative promotes environmentally friendly technologies that reduce pesticide use and associated drift.

These include:

- Equipment designed to deliver pesticides more precisely to the target, reducing use and waste. For example, DPR funded purchase of several "smart-spraying" devices for university farm stations to lend to farmers. These application rigs turn nozzles off in the spaces between plants.
- Variable-rate technologies that adjust the rate of application according to variations in field conditions.
- Remote-sensing and mapping technologies that can reduce pesticide use by guiding variable-rate applications, for example, mapping to pinpoint the most heavily infested areas so applications can be targeted there.
- In 2008, Governor Schwarzenegger supported DPR's request to reinstate funding for grants that promote integrated pest management to reduce the need for chemicals in favor of preventive strategies that work with the environment. Grants include funding to the grape, peach and almond industries to reduce the use of pesticides that can harm air quality.

Expanding Our Knowledge About Pesticides in Air

Throughout 2006, DPR conducted air monitoring in the Fresno County community of Parlier to learn what pesticides were in the air of a rural farm community and how levels varied over a year. The project was part of the California Environmental Protection Agency's Environmental Justice Action Plan.

The Parlier project built on the knowledge and experience DPR had gained in more than two decades of conducting dozens of air monitoring studies.

The project marked:

- The first time a community advisory group helped DPR frame goals, select monitoring sites, and decide other project elements.
- The first time DPR released preliminary results and evaluations during a project, posting interim reports online and discussing them with the local advisers at public meetings.
- The first time DPR or any government agency in the U.S. did pesticide air monitoring for 12 months in a single community.
- The first project to monitor so many pesticides – 40 in all, including pesticide breakdown products. It was also the first to include monitoring conducted jointly by DPR and the Air Resources Board for both pesticides and nonpesticide air pollutants like ozone.

Because there are no state or federal standards for most pesticides in air, DPR scientists worked with technical experts from other agencies to develop screening levels for the pesticides monitored. These levels helped DPR scientists evaluate the possible health effects of exposure.

Since Parlier is similar to many Central Valley towns, surrounded by farm fields and the associated use of pesticides, the analysis of hundreds of monitoring samples taken over a full year added substantially to our knowledge of pesticides in air.

DPR held a community fair in Parlier to kick off the project. We invited two dozen local agencies to talk about jobs, education, safety and health. These children – among 300 attendees – got to meet their local firefighters.

Highlights of the project's cumulative report, released in 2009, were:

- The greatest potential health risk in Parlier was not from substances used as pesticides but from two air pollutants found throughout California: acrolein and formaldehyde. Concentrations were similar to those found elsewhere in the state. The most likely sources are auto and industrial emissions.
- Of the 35 pesticides monitored (plus 5 pesticide breakdown products), 16 were detected (plus 3 breakdown products.) Measured amounts varied, depending on the pesticide.
- The insecticides chlorpyrifos and diazinon were among the pesticides found most often. Amounts were below health screening levels, with one exception. These chemically related pesticides posed the highest noncancer risk among pesticides detected, prompting DPR to direct added resources to ongoing risk assessments for these compounds.
- Detections of 1,3-dichloropropene (1,3-D) prompted DPR to reopen its risk assessment and reexamine the management plan designed to keep 1,3-D levels below levels that may pose a risk. This fumigant is a carcinogen and lifetime exposure at the levels detected may be of health concern.

Several years before the Parlier project, DPR began planning a network of monitoring stations to sample for pesticides in air over two or more years. The Parlier project served to test and perfect sampling protocols, develop health screening levels, improve and expand laboratory analytical methodology, and fine-tune approaches to data analysis.



Protecting Surface Water

Pesticides can compromise water quality. If they do, the problem might be traced to a river surrounded by farms or a stream in an urban neighborhood. Whatever the source, DPR is committed to solving water quality problems caused by pesticides, using the best science available and finding workable, effective solutions. Our actions draw from data gathered in more than 25 years of water quality monitoring and analyses.

For example, diazinon and chlorpyrifos are two insecticides found often in surface water. At our request, manufacturers added new use instructions to their product labels, designed to reduce concentrations in surface water. We continue to monitor waterways to see if the controls are working. Because pesticide use varies each year depending on weather and pest pressures, several years of data will be needed.

In 2007, DPR adopted regulations to protect water from runoff of agricultural insecticides applied to tree and vine crops during the winter dormant season. The new rules require the use of alternative pesticides, a buffer zone between the application and waterway, or other means to prevent contamination.

We also support outreach to educate pesticide users on proper pesticide use and disposal, and on how to prevent pests using integrated pest management strategies that stress less pesticide use.

A more comprehensive approach

Because more needs to be done to reduce surface water contamination, DPR explored a more comprehensive approach. We began with an informal dialogue with stakeholders in 2009. We met with county agricultural commissioners, industry groups, the State and Regional Water Boards, and representatives of wastewater treatment plants and stormwater agencies to draft a series of potential controls. In early 2010, DPR held three workshops to get public comments on the draft.

Our goal is to develop controls that are practical, enforceable and effective in improving the environment. Building on the dormant spray regulations, the new rules would affect both agricultural uses and nonagricultural pesticides used by pest control businesses (not consumers). The controls would affect as many as 30 pesticides found in surface water at levels toxic to aquatic organisms. DPR expects to begin formal rulemaking in 2011.

Cleaning up copper

Over the past several years, we have also been working with local and regional agencies, environmental groups, the boating industry and marina representatives to improve water quality in bays and marinas. Most boats are painted with copper-based paints to prevent the growth of barnacles, slime, weeds and other organisms. Copper is considered a pesticide when used in this way. In 2006, DPR monitoring found that copper concentrations in many marinas exceeded levels that could harm marine life.

In mid-2010, DPR opened a reevaluation of copper boat paints to find ways to reduce copper concentrations in marina waters. DPR is also working with stakeholders to encourage voluntary development of and use of alternative coatings and management practices to reduce copper contamination. DPR has been working with the University of California and the Port of San Diego on major projects to evaluate the efficacy of alternative boat paints, and to estimate costs for their use.