Federal law and a legal mandate require California to reduce smog-producing emissions of volatile organic compounds (VOCs) from pesticides in areas that do not meet air quality standards. The Department of Pesticide Regulation (DPR) estimates and tracks emissions, based on pesticide use reports and data on the VOC content of pesticide products. DPR then uses this information to develop strategies to reduce emissions as required under legal mandates.

VOC are carbon compounds that are released or evaporate into the atmosphere, where they react with other substances to form ground-level ozone ("smog"). In California, the primary source of VOCs is vehicle exhaust. Industrial operations also emit VOCs, as do thousands of products, including pesticides. Under the federal Clean Air Act, all parts of the country must meet national standards for airborne pollutants such as ozone. Many regions in California do not meet these standards and are designated "nonattainment areas" (NAAs).

**What is an emission inventory?**

An emission inventory is a systematic listing of the sources of air pollutants, including an estimate of how much pollutant each source or category emits over a given time period. It is not possible to measure emissions continuously from every individual source of pollution, and from all source types, particularly the thousands of small sources throughout a region. In practice, regulators routinely estimate atmospheric emissions using various scientific methods and approaches. Then they compile emission estimates into "inventories" or databases and report or publish the results periodically.

Under federal law, states must inventory and track all sources of air pollutants, including VOCs. This is so states can show that they are making progress in meeting federal air quality standards.

**What information is in DPR's emission inventory?**

As California’s pesticide regulator, DPR prepares an annual estimate of VOC emissions from agricultural and commercial structural pesticide applications. There is an emission inventory for each year since 1990, the baseline year. Pesticide applications in five NAAs are included: Sacramento Metro, San Joaquin Valley, South Coast, Southeast Desert, and Ventura. Only agricultural and commercial structural pesticide applications are included. The Air Resources Board tracks emissions from consumer pesticide products.
DPR uses data on VOC content and pesticide use to estimate emissions from reported agricultural and commercial structural applications in each NAA. The inventory focuses on May 1 through October 31, the peak ozone season in California.

**How is the pesticide VOC inventory used?**

DPR uses the VOC inventory to identify the various pesticidal sources of VOCs, track changes in pesticide VOC emissions over time, suggest and evaluate potential VOC emission reduction strategies, and track progress in meeting pesticide VOC reduction goals.

**How does DPR calculate VOC emissions?**

To estimate the VOC contribution of individual agricultural and structural use pesticides, DPR multiplies the fraction of a pesticide product estimated to be VOCs (its “emission potential”) by the amount of that product applied.

\[
\text{Estimated VOC emissions} = \left(\frac{\text{Emission potential of the product}}{\text{Pounds of pesticide product applied}}\right)
\]

Pesticide use reports provide the amount of product used. California requires full reporting of all agricultural pesticide use and the use of pesticides by pest control businesses.

Because DPR has monitoring data from field applications of fumigants such as methyl bromide, the calculation is adjusted for fumigants to account for how emissions vary depending on fumigation method.

**How is the VOC content of a product determined?**

The preferred way is through laboratory analysis, using a standardized method approved by DPR (thermogravimetric analysis, or TGA). When it is not available, DPR uses other approaches to decide emission potentials:

- Using the VOC emission potential already measured in TGA analysis of an identical or nearly identical pesticide product.
- Using the confidential statement of formula on file with DPR to find out the percentage of water and other inorganic chemicals in the product. This is subtracted and the remainder is assumed to produce emissions that must be included in the inventory.
- Assigning an estimated value based on an evaluation of a product’s unique chemistry and composition. DPR takes this approach for high-use products with well-known chemical properties.
- Assigning a default emission potential at a representative level, based on measured data that reflect the behavior of similarly formulated products.