



Department of Pesticide Regulation



Brian R. Leahy
Director

MEMORANDUM

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Governor

TO: Brian R. Leahy
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SUBJECT: RECOMMENDATION ON TOWNSHIP CAP EXCEPTION REQUESTS FOR
FOR 1,3-DICHLOROPROPENE

Background

1,3-dichloropropene (1,3-D) is a fumigant used to control several soil-borne pests prior to planting a variety of crops including strawberries, almonds, grapes, carrots, sweet potatoes, and walnuts (Figure 1). Most 1,3-D use occurs in the San Joaquin Valley and Central Coast regions. Due to action taken by the Department of Pesticide Regulation (DPR, then part of the California Department of Food and Agriculture), for most of a five-year period from 1990 to 1994, 1,3-D was not used in California. In 1989, approximately 18 million pounds of 1,3-D was used. Although the average annual use of 1,3-D since 1995 is approximately 6.4 million pounds per year, use by 2012, the most recent year for which data is available, has risen to approximately 12 million pounds per year (Figure 2).

The action taken by DPR in April 1990 was to direct the County Agricultural Commissioners to suspend all permits for the use of 1,3-D applications in California. This action was based upon the results of limited monitoring studies in one high use county that indicated potentially high risk of cancer if some of the detected inhalation exposure levels persisted over a long-term (70 years). Following this action, Dow AgroSciences (DAS, the registrant, then Dow Elanco) conducted several years of research to reduce exposures to handlers and bystanders, and proposed mitigation measures. Implementing the new use practices to reduce ambient air exposure in combination with limits on the absolute amount of the fumigant used, DPR allowed the reintroduction of 1,3-D in 1995. The regulatory requirements both on use practices and limitations on the amount used have been modified several times since 1995. Since 1999, the key mechanism that has been used to restrict use has been a cap on 1,3-D use within each



township (6x6 mile area) of 90,250 pounds (ATP)¹ per year which is administered by DAS as a requirement for continued registration. There are approximately 42 counties and 450 townships that have had some 1,3-D use. In 2001, DPR authorized use above the cap in five townships in recognition of specific circumstances facing a segment of the agricultural sector and based upon the fact that there had been not been any use in the state for the five year period between 1990 and 1995. Since that time, DAS with the input from DPR scientists have been working on a model (SOFEA) that predicts the ambient air levels in specific areas from the pounds used in the applications that take place. Since 2001, DPR has approved on an annual basis, exceptions to the township cap in a small percentage of the townships where 1,3-D is used, taking into consideration historical use and need.

Current Situation

Several ambient air monitoring studies have been conducted since the reintroduction of 1,3-D, including some studies with one or more years of monitoring. In 2006, DPR and the Air Resources Board (ARB) conducted a year-long monitoring study for several pesticides, including 1,3-D, as an environmental justice pilot project in Parlier (Fresno County). A 24-hour sample was collected once every six days at one site for all of 2006. The final evaluation of the Parlier results was completed in 2009. While there are some aspects of the study discussed below that reduce its certainty as an indicator of cancer risk, that study detected 1,3-D air concentrations that exceed levels DPR considers protective, even though that region had not reached the township cap (Table 1). The results prompted DPR to initiate a review of and to complete its preliminary risk assessment of 1,3-D, updating its past evaluation of long-term as well as short-term exposures. The risk assessment should be completed in the next 18-24 months.

In 2009, after the evaluation of air monitoring data in Parlier, DPR also requested that DAS conduct air monitoring in nine townships in Merced, one of the highest 1,3-D use regions. DAS initiated the air monitoring project in October 2010, completed monitoring in December 2011, and submitted a report to DPR in January 2013. DPR had allowed several townships in the monitoring region to exceed the township cap during this time period provided that this monitoring was conducted. A 72-hour sample was collected once each week at each of the nine sites (one site per township). While this study has the same factors that reduce its certainty as an indicator of risk, results from this monitoring also detected 1,3-D air concentrations that exceeded DPR's regulatory goal (Table 1).

At DPR's request, ARB began monitoring for 1,3-D and other fumigants in high-use areas of Ventura County (Camarillo) and Santa Barbara County (Santa Maria) in August 2010, and in

¹ 1,3-D allocations are based upon pounds that have been *adjusted* using application factors that vary from 0.3x to 2.3x of pounds applied depending on fumigation method, month, and region. The application factor indicates the relative amount of 1,3-D that is potentially present in the air near treated fields. The higher the application factor value, the greater the proportion of the applied 1,3-D that may escape into the air.

Monterey County (south of Watsonville) in January 2012. A 24-hour sample was collected at one site in each of the communities once every six days, and monitoring continues at these three sites. Results from this monitoring in 2011 and 2012 showed 1,3-D air concentrations likely exceeding DPR's regulatory goal (Table 1), although the same factors discussed below lessen its certainty as an indicator of risk applies to these results.

In February 2011, DPR initiated its air monitoring network, collecting a 24-hour sample once each week at one site in each of three communities: Ripon (San Joaquin County), Salinas (Monterey County), and Shafter (Kern County). Monitoring has continued since then, but the 1,3-D results from the first five months should not be used due to the high detection limit for 1,3-D during that period. For 2011 and 2012, air concentrations were relatively low, just below or just above DPR's regulatory goal (Table 1).

Although the results of the air monitoring cannot be ignored, there are several factors that create uncertainty about their use as an indicator of cancer risk:

- The air concentrations reflected in the study results are *one-year averages*, while the regulatory goal is an average for a 70-year lifetime.
- Monitoring did not occur continuously in any study, so the air concentrations during the unmonitored periods are unknown. DPR's yearly concentrations are based on one day of sampling each week. ARB's yearly concentrations are based on one day of sampling every six days. DAS's yearly concentrations are based on three sequential days of sampling each week.
- DPR's detection limit for most of the monitoring was 0.1 ppb, ARB's was 0.03 ppb, DAS's was 0.001 ppb. DPR normally assumes that samples with no detectable amount have a concentration of one-half the detection limit, 0.05 ppb for DPR's samples. Other assumptions would result in different average air concentration estimates, particularly since all of DPR's and ARB's sites have more than 75 percent of the samples with no detectable amount. In October 2013, the laboratory analyzing DPR's samples was able to lower the 1,3-D detection limit to 0.01 ppb.

DPR and ARB staff continue to conduct monitoring, and DPR staff are conducting additional evaluations of the monitoring data, relating the measured air concentrations to use patterns. Work also continues with evaluation of the computer model (SOFEA) to estimate the range and probabilities of long-term 1,3-D air concentrations based on emissions from field monitoring studies, hypothetical use patterns derived from pesticide use data, and historical weather data.

Concerns Raised by Denial of Exception Requests

The Sweet Potato Council has provided a letter outlining significant economic impacts of denying 1,3-D exception requests. The Almond Board has also expressed their concerns with regards to the inability of their farmers to plant the trees they ordered 3 years in advance and are

scheduled for delivery and planting in 2014. In addition, there are other disadvantages that should be considered. It is likely that the inability to use 1,3-D would result in increased use of other fumigants, replacing the hazard of exposure to this product with potentially more immediate risks of exposure to other fumigants. Denial of 1,3-D exception requests could also affect U.S. EPA's efforts to phaseout methyl bromide due depletion of stratospheric ozone which relied upon the availability of 1, 3-D to reduce the requests for critical use exemptions to the phaseout.

Recommendation

The combination of information from various air monitoring projects support the recommendation that DPR should not approve any township exceptions until the data from such projects have been thoroughly evaluated and DPR's final risk assessment for 1,3-D has been completed.² This will allow the current practice and need for possible future action to protect the public to be more fully assessed.

² The only exception DPR should consider is to approve use associated with alternatives research. DPR may also want to approve quarantine or other special applications that exceed the township cap.

Figure 1. 1,3-D use by crop/site for 2010-2012. Annual average statewide use of 1,3-D during 2010-2012 was approximately 10,500 pounds.

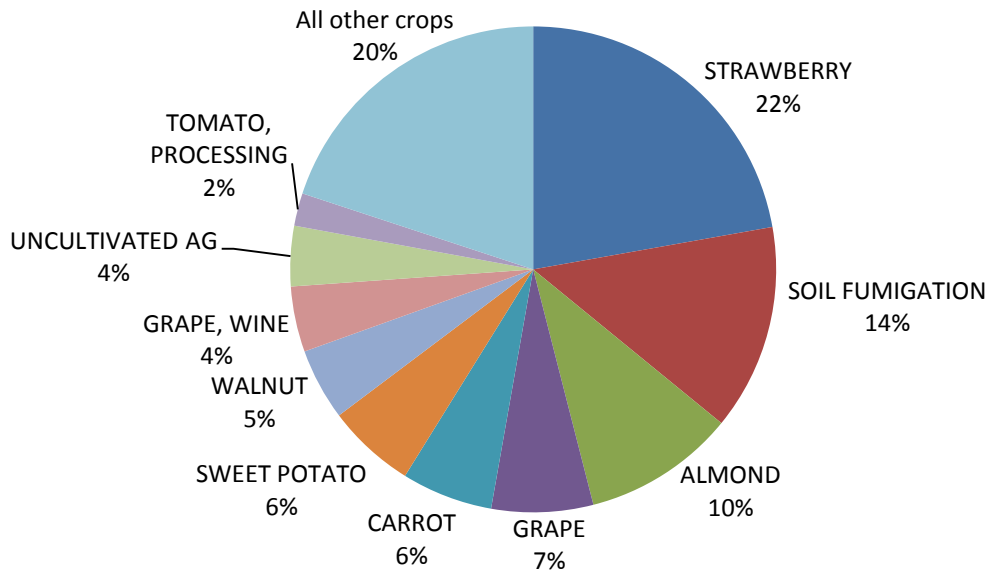


Figure 2. Statewide use of 1,3-D. Use was stopped in April 1990, and reintroduced in 1995. The decrease in 2009 was primarily due to DAS production issues.

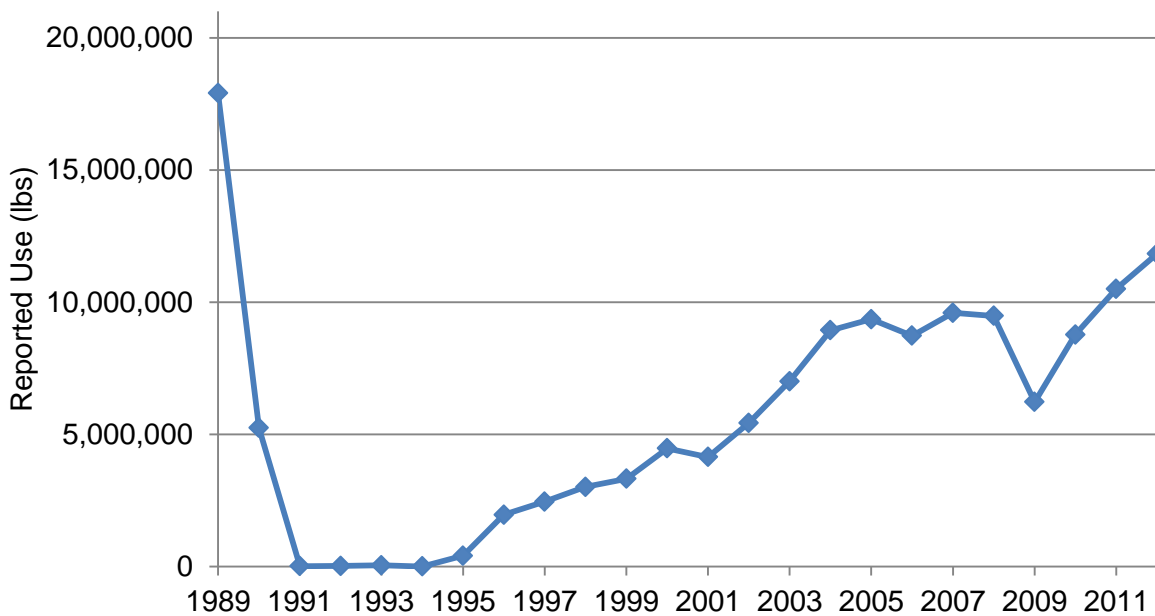


Table 1. Summary of 1,3-D air concentrations. Blank cells indicate the site was not sampled for that year. DPR's detection limit is 0.1 ppb (lowered to 0.01 ppb in October 2013). Samples with no detectable amount are assumed to contain one-half the detection limit when calculating average concentrations. DPR's regulatory goal is not to exceed 0.14 ppb as a 70-year lifetime average.

Location (Study)	1,3-D 1-year Average Concentration (ppb)		
	2006	2011	2012
Parlier (EJ Pilot)	0.477		
Camarillo (ARB)		0.172	0.191
Santa Maria (ARB)		0.164	0.192
Watsonville (ARB)			0.161
Ripon (Air Network)		0.173*	None Detected
Salinas (Air Network)		0.153*	0.064
Shafter (Air Network)		None Detected*	0.085
Merced township 06S10E (DAS)		0.180	
Merced township 06S11E (DAS)		1.081	
Merced township 06S12E (DAS)		0.205	
Merced township 07S10E (DAS)		0.296	
Merced township 07S11E (DAS)		1.820	
Merced township 07S12E (DAS)		0.699	
Merced township 08S10E (DAS)		0.098	
Merced township 08S11E (DAS)		0.216	
Merced township 08S12E (DAS)		0.116	

* Based on data from 6 months