California Department of Pesticide Regulation
Mitigating Sulfuryl Fluoride Use in Structural Fumigations
Pesticide Registration and Evaluation Committee - Summary Information

Lisa Ross, Environmental Program Manager II
Worker Health and Safety Branch
July 18, 2014

- September 2006 – DPR completed a Risk Characterization Document (RCD) for Sulfuryl Fluoride (SF) used in structural and *non-food commodity fumigations* and identified exposure scenarios of concern: worker, bystander, and residential exposure, based on limited data and using health-protective factors to compensate for data uncertainties

- April 2007 - DPR issued a Risk Management Directive based on the RCD for SF use in structural and *non-food commodity fumigations* requiring the mitigation of acute and repetitive worker exposures, and acute exposures for residents and bystanders

- June 2007 – SF designated a toxic air contaminant (TAC) in regulation (Section 6860(a))

- June 2008 – DPR initiated reevaluation of SF products intended for structural fumigation due to the RCD. Also of concern was the decrease in the permissible reentry concentration for SF from 5 ppm to 1 ppm, as defined on the labels in 2006. The tarpaulin removal and aeration plan (TRAP) might not be adequate to meet this 1 ppm level, thereby requiring SCBA to be worn during tarp removal. DPR requested data to assess if TRAP, or another method, is adequate to reduce risks to workers, bystanders and residents.

- During the course of this reevaluation, TRAP was replaced with the California Aeration Plan (CAP) – first implemented November 2010. This CAP method was used in the studies submitted to DPR under SF reevaluation. Review of these studies indicates use of the new CAP method reduces acute and repetitive worker exposures to SF used in structural fumigations.

- The SF reevaluation was concluded in March 2013

- Subsequently, CAP 2 was implemented May 2013, to further improve indoor aeration and to address aeration duct placement and construction.

- Meanwhile, the TAC law was recently amended (FAC sections 14022, 23, and 24) to require DPR to adopt mitigation measures within two years of a decision to mitigate a pesticide that is determined to be a TAC (or HAPTAC); effective January 1, 2014.

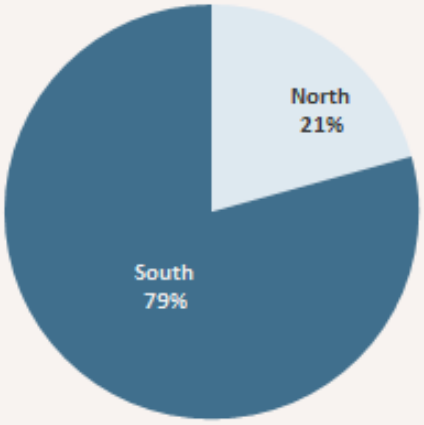
- DPR is now evaluating SF data and exposures to bystanders and residents to assess potential mitigation strategies.

Top 10 Counties for Sulfuryl Fluoride Use 2008 to 2012

County	TOTAL Pounds Applied	Annual Average	Percent of Total Use
Los Angeles	3,519,387	703,877	32%
Orange	2,025,190	405,038	18%
San Diego	1,957,772	391,554	18%
Santa Clara	943,813	188,763	8%
Santa Barbara	322,500	64,500	3%
Ventura	308,926	61,785	3%
Alameda	256,792	51,358	2%
San Bernardino	246,655	49,331	2%
Riverside	241,579	48,316	2%
San Mateo	218,859	43,772	2%
Total	11,165,594.81	--	90%

1

Northern vs. Southern California: Pounds Applied from 2008 to 2012



Separated by Northern border of

- San Luis Obispo Co.
- Kern Co.
- San Bernardino Co.

North = 2,310,475 pounds

South = 8,855,120 pounds

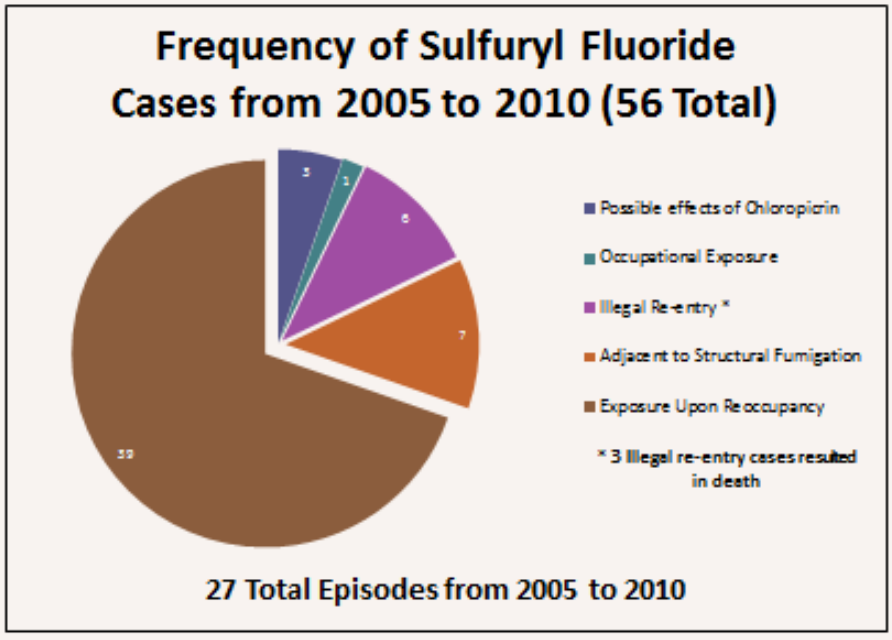
2

Location of Illness Cases* from 2005 - 2010

County	Total Illness Cases
San Diego	17
Orange	14
Los Angeles	8
Monterey	8
Riverside	3
Contra Costa	2
Santa Cruz	1
Fresno	1
Sacramento	1
San Bernardino	1
Total	**56**

* 1 case = 1 person affected

3



4

Department of Pesticide Regulation

Mary-Ann Warmerdam
Director

Arnold Schwarzenegger
Governor

M E M O R A N D U M

TO: Jerry Campbell, Assistant Director
Pesticide Programs Division

FROM: Paul Gosselin
Chief Deputy Director
(916) 445-4000

DATE: April 6, 2007

SUBJECT: RISK MANAGEMENT DIRECTIVE FOR SULFURYL FLUORIDE

This memorandum outlines the Department of Pesticide Regulation's (DPR's) risk management decision related to the development of restrictions on the use of sulfuryl fluoride. The risk management directive represents a joint and mutual decision of DPR and the Office of Environmental Health Hazard Assessment as it relates to worker protection.

Summary

Currently there are two registered products in California containing sulfuryl fluoride; Vikane®, used for structural fumigation and non-food commodity fumigation; and ProFume®, used in post-harvest food commodity fumigation. In July 2006, DPR staff completed a risk characterization document (RCD) for sulfuryl fluoride in Vikane®. As part of the review and approval process, the RCD was subjected to the Toxic Air Contaminant Act and Birth Defects Prevention Act processes. This RCD addressed risks associated with (1) occupational exposures to those involved in structural and non-food fumigation practices, (2) bystander exposures to ambient and off-site air concentrations, and (3) residential exposures upon reentry into fumigated homes. In the completed RCD, staff identified scenarios where exposures to sulfuryl fluoride for acute, one-two weeks, seasonal, and/or chronic durations would pose health concerns. An addendum to the RCD to address the use of ProFume® is in development at DPR.

Based on the recommendations from the completed sulfuryl fluoride Vikane® RCD, please take appropriate steps to have staff initiate the development of regulatory measures to mitigate acute and repetitive exposures for workers, and acute exposures for residents and bystanders related to all structural and non-food commodity fumigations. Our mitigation efforts should ensure that acute exposures to sulfuryl fluoride do not exceed the 24-hour time-weighted average (24-hr TWA) reference concentrations of 2.57 ppm (10.7 mg/m^3) for workers and 0.12 ppm (0.51 mg/m^3) for bystanders and residents. The 24-hr TWA reference concentrations for repetitive exposures for workers are 0.48 ppm or 2.01 mg/m^3 (1-2 weeks), 0.14 ppm or 0.60 mg/m^3 (seasonal), and 0.04 ppm or 0.18 mg/m^3 (chronic). A note should be made that the acute mitigation measures for bystanders and residents includes an additional uncertainty

factor because a developmental neurotoxicity study has not been conducted and DPR has concerns about the neurotoxic effect of sulfuryl fluoride. Once the RCD addendum for ProFume® use is completed, a determination will be made on the need for mitigation. Finally, if you identify the need for additional data necessary for the mitigation process, you should utilize our reevaluation or registration authority (e.g., 1,3 dichloropropene) to require the registrants to supply necessary data.

If you have any questions, please contact me.

cc: Allan Hirsch, Chief Deputy Director
Office of Environmental Health Hazard Assessment

Victoria Hornbaker, Registration Branch, DPR

Department of Pesticide Regulation

Brian R. Leahy
Director

Edmund G. Brown Jr.
Governor

M E M O R A N D U M

TO: John DaMassa
Modeling and Meteorology Branch, Chief
California Air Resources Board

FROM: David Duncan *Original Signed By*
Environmental Program Manager II
916-445-3870

DATE: February 20, 2014

SUBJECT: REQUEST FOR METEROLOGICAL DATA NEEDED FOR SULFURYL FLUORIDE COMPUTER SIMULATION PROJECT

Sulfuryl fluoride is a pesticide primarily used to fumigate houses and other structures. In 2007, the Department of Pesticide Regulation (DPR) listed it as a toxic air contaminant and issued a risk management directive. Monitoring by the Air Resources Board (ARB) and others indicate that some air concentrations exceed the regulatory target levels set by the risk management directive. To assist in developing measures to mitigate these exposures, DPR intends to use air dispersion modeling with AERMOD. This will be the first time DPR uses AERMOD, and as part of the consultation required under Food and Agricultural Code section 14023(f), DPR requests ARB's assistance with this modeling.

Specifically, DPR requests representative meteorological data in certain areas. AERMOD requires two types of meteorological data: surface observations and vertical profile measurements. DPR plans to organize the AERMOD modeling for sulfuryl fluoride as two phases. Each phase has its particular meteorological data requirement as described below.

Phase I

Phase I will develop the AERMOD modeling procedure for the simulation of structural fumigations and to determine the specific modeling set-up for this project. For this phase, two ARB air monitoring studies will be modeled with the same environmental and weather conditions as the fumigation. The model estimates will be compared to the field measurements and help to adjust model settings. The locations and dates of these two studies are:

- Loomis, CA (UTM Zone 10S, 659033m E, 4294265m N), June 29 – July 4, 2004
- Grass Valley, CA (UTM Zone 10S, 670706m E, 4341235m N), July 18 – 24, 2004

Two types of the meteorological data for 2004 are needed for each of the two study locations. The first type is one-year surface observations recorded by the stations closest to each study site. The second type is one-year upper air measurements close to the study area. All the data should be formatted for use by AERMET, a program pre-processing weather station observations into

the formatted files used by AERMOD. The data completeness requirement and substitution procedure follow the guidance of U.S. Environmental Protection Agency (USEPA, 2000). If the substitution is used, the procedure should be provided. The weather station information including location, elevation, and instrument height are also needed. The data will be processed by DPR using AERMET and the output files will be used for AERMOD.

Phase II

Phase II will model the potential exposure of sulfuryl fluoride in residential areas of counties with most use of structure fumigation and to develop mitigation measures to reduce the health risk to bystanders in these areas. For this phase, DPR will model representative structures from five counties to estimate their potential exposures during a five-year period (2008 - 2012). Thus DPR requests five-year meteorological files that have been processed by AERMET and ready for use by AERMOD.

DPR plans to model fumigations in the following five counties among the top eight for use of sulfuryl fluoride: Alameda, Los Angeles, San Bernardino, San Diego, and Santa Clara. For each county, two to three sets of meteorological files for AERMOD input are needed depending on the availability for each year of 2008 -2012. Each set of meteorological files should include a surface data file and a profile data file that are processed from observations of a representative surface weather station in the county and a representative upper air station. Upper air stations should correspond to weather conditions of the Southern California coastal area, the Southern California inland area, and the Bay Area. The surface parameters such as Albedo, Bowen Ratio, and Surface Roughness Length used in AERMET processing should represent the targeted residential area. Their values need to be presented with their determining methods.

Technical Advice

In addition to the meteorological data, DPR may need additional data or technical advice for the modeling. Assignment of an ARB technical advisor for this project would be greatly appreciated. Any examples of ARB modeling for similar situations would also be appreciated.

Thank you for your assistance. Please contact me with any general questions. For technical questions about the request, please contact Jing Tao at, <Jing.Tao@cdpr.ca.gov> or 916-317-6584.

cc: Lynn Baker, ARB Staff Air Pollution Specialist
Pingkuan Di, ARB Supervisor I
Randy Segawa, DPR Environmental Program Manager I
Jing Tao, DPR Environmental Scientist

Reference

U.S. Environmental Protection Agency, 2000. Meteorological Monitoring Guidance for Regulatory Modeling Applications. Publication No. EPA–454/R–99–005. Office of Air Quality

Planning & Standards, Research Triangle Park, NC. (PB 2001– 103606) (Available at http://www.epa.gov/ scram001/)