

Appendix A. Monitoring Recommendations of the Exposure Subgroup
of the Lompoc Interagency Work Group, April 1998

To: Department of Pesticide Regulation
From: Lompoc Interagency Work Group
Date: April 1998
Subject: Air Monitoring Recommendations

Summary

The Lompoc Interagency Work Group (LIAWG) recommends a two stage air monitoring plan. In both stages the LIAWG recommends monitoring for 24-hour periods, 4 days per week, for 8 weeks at 5 to 7 sampling locations emphasizing west and north edges of town, closest to agricultural areas. This monitoring plan is intended to implement the Tier 1 recommendations accepted by the LIAWG in January 1998. The focus in this monitoring plan is on the upper half of a list of agricultural pesticides commonly used near Lompoc and which were ranked based on use, toxicity and volatility.

The first stage consists of monitoring for pesticides in Pesticide Subset 1 during the 1998 use season. Pesticide Subset 1 is comprised of pesticides for which analytical methods have already been developed by laboratories at either the Department of Food and Agriculture (DFA) or Air Resources Board (ARB). A combination of four components are recommended in the first stage: (1) monitoring for pesticides which have been monitored for under the AB1807 monitoring program (2) monitoring with an organophosphate screen (3) monitoring for MITC (metam sodium) and methyl bromide (4) monitoring for metals in particulates, which may be an indicator of air concentrations of some commonly used fungicides.

In the second stage during the 1999 use season, the LIAWG recommends monitoring for Pesticide Subset 2, which consists of most of the 23 active ingredients in the top half of the ranked, active ingredient list. If it should be possible to develop the needed methods to conduct monitoring for Pesticide Subset 2 during the 1998 growing season, then this would be the preferred action plan.

I. Introduction

The LIAWG devised a strategy for answering the following three questions:

1. Are Lompoc residents exposed to pesticides in air?
2. If so, which pesticides, and in what amounts?
3. Do these levels exceed human health standards?

On January 23, 1998, the Exposure Subcommittee (ES) of the LIAWG recommended to the LIAWG that air monitoring be conducted and that pesticides be ranked based on use in the Lompoc area, volatility, and toxicity. The LIAWG received and approved of the recommendations and requested the ES to draft a study plan for monitoring. The ES presented a work plan to the LIAWG on March 20, 1998. With minor modifications, this draft plan was approved by the LIAWG.

The LIAWG is focusing on the “first tier” of the recommended monitoring:

Community ambient air monitoring, i.e., outdoor air of the town of Lompoc

Community outdoor air monitoring is considered the most effective way to quantify the town's exposure to pesticides. Other types of monitoring such as indoor air, partitioning dust/air, partitioning fog/air, and targeted monitoring near field applications, may be considered. However, these other types are related to more specific exposures and, if warranted, would be conducted at a later date or in a “second tier.”

Discussion and analysis of available data have resulted in several considerations:

-Reporting results in a timely manner is a priority. Members anticipated that May 1998 was the earliest possible month monitoring could occur. However, in consideration of laboratory preparation, June or July are probably more realistic.

-Monitoring in areas where exposure to airborne pesticides is more probable than in other areas of Lompoc was considered an efficient use of costly resources. Specifically, monitoring in areas of the town closest to areas of high agricultural pesticide use and during months of high pesticide use. Such monitoring will not provide exact estimates of exposures for most residents, but will provide upper bound air concentrations. That is, concentrations are unlikely to be greater in unmonitored areas of the town or during unmonitored times.

-The LIAWG considered that one objective was to capture shorter periods of peak exposure that may occur during and 1 to 2 days following applications. The LIAWG was concerned that monitoring capture these probable peak exposures. For example, monitoring for methyl bromide, which has a relatively large number of pounds used in the Lompoc area, is particularly problematic. It dissipates quickly (within 1 to 2 days) and, although it is used in high amounts, these amounts are applied in relatively few applications. Therefore, continuous monitoring for methyl bromide may not be efficient because most samples would be taken during periods where no methyl bromide has been applied.

Specific Objectives of Community Ambient Air Monitoring (Tier 1): From the above considerations, the following two objectives emerged:

1. To determine, in a timely manner, the upper bound to probable outdoor air concentrations in the town. Specifically, to measure air concentrations of the majority of high ranking pesticides (based on use, flux, and volatility) during a period of high agricultural pesticide use and emphasizing areas of the town closest to agricultural pesticide applications.

2. To measure outdoor air concentrations in the town during short periods within probable

peak exposures. Specifically, to measure air concentrations during and immediately following pesticide applications in and near the town.

The committee agreed that the first objective could be met by daily 24-hour air monitoring at several locations over a two-month period. In contrast, setting up less frequent monitoring over the course of six months may not adequately describe the town's exposure and would not provide timely results.

The second objective may be met by collecting samples during many days throughout a two month period and relating the results of chemical analysis to recorded pesticide applications during the monitoring time period. Monitoring over many days also allows for more accurate subchronic and chronic exposure estimates for the first objective.

Discussions with DFA and ARB laboratory personnel have made it clear that the time frame for monitoring leaves no time for developing sampling and analysis methods for monitoring in 1998. Therefore, LIAWG is recommending a two-stage study, with monitoring to take place during application periods in 1998 and 1999. Monitoring for Pesticide Subset 1 in 1998 includes a combination of four components to monitor for pesticides which do not require methods development. With the longer lead time, monitoring for Pesticide Subset 2 in 1999 would constitute a more extensive sampling in trying to include most of the twenty three pesticides in the top half of the list.

If the methods can be developed for monitoring for Pesticide Subset 2 in time to monitor during the 1998 use season, then the LIAWG recommends proceeding with the single year monitoring plan in 1998 consisting of monitoring for Pesticide Subset 2 during the 1998 use season. In addition, ongoing literature searches for analytical methodologies should be continued.

II. Proposed monitoring in two stages

A. Pesticide Subset 1 - Sampling for pesticides with methods already developed

1. Eight week period, in 1998 use season, monitoring to begin in June or July
2. Monitoring 4 days/week
3. 24-hour sampling
4. 5-7 monitors, located preferentially on west edge of town, north edge and 1 sampler interior portion of town
5. Concurrent meteorological data will be collected at the H St. site and should be collected from at least one other sampling location. Any meteorological studies proposed by the Inversion Subgroup and endorsed by the LIAWG should be run concurrent with the monitoring.

6. At each monitoring site, sampling will consist, ideally, of all four components
 - a. Component 1 - monitoring for AB1807 compounds
 - (1) Monitor for AB1807 compounds - select 1-3 compounds from the following list:
 - (a) alachlor
 - (b) chloropicrin
 - (c) chlorothalonil
 - (d) chlorpyrifos
 - (e) diazinon
 - (f) fenamiphos
 - (g) mancozeb
 - (h) methomyl
 - (i) oxydemeton-methyl
 - (j) permethrin
 - (2) These active ingredients have been monitored for (or will soon be monitored for) under AB1807 and will not require methods development
 - (3) Previous monitoring of these compounds have typically been conducted in high use areas and therefore the previous AB1807 monitoring would provide basis for comparison of any monitoring results from Lompoc
 - (4) Sampling media is XAD resin for most of the above compounds
 - (5) Utilize samplers with low to medium volume air sampling rates as were used in AB1807 type monitoring (3-10 liters per minute)
 - b. Component 2 - organophosphate screen
 - (1) within the top 23 pesticides, there are eight organophosphates
 - (a) acephate
 - (b) chlorpyrifos
 - (c) diazinon
 - (d) dimethoate
 - (e) disulfoton
 - (f) fenamiphos
 - (g) fonofos
 - (h) oxydemeton-methyl
 - (2) Use a screening methodology to monitor for as many of the organophosphates and their oxone forms as methodology and standards availability allows
 - (3) Organophosphate use tends to be steady through growing season
 - (4) Sampling media is XAD resin

(5) Use of high volume vs. low volume air sampling rates must consider likelihood of conversion to oxone forms and ability to detect oxone forms

C. Component 3 - monitoring for MITC (metam sodium) and methyl bromide

- (1) These active ingredients are normally sampled for with charcoal tubes (alternatively, SUMMA canisters). The infrequency of applications and the relatively rapid dissipation require a component that is more targeted in time
- (2) At sampling sites, pumps set up and ready to go, field personnel already have charcoal tubes
- (3) Utilize 18 hour prenotification from Agricultural Commissioner to notify field personnel to install charcoal tubes onto pumps for monitoring for either methyl bromide or MITC for 3 days, including day of application
- (4) Monitor at low volume rates

d. Component 4 - sampling for metals in the air

- (1) particulate samples will be collected for metals analysis
- (2) results may provide indication of possible elevated levels of maneb or mancozeb, which contain manganese and are frequently used fungicides
- (3) background levels exist for a 20- city monitoring network which can be used for comparison

B. Pesticide Subset 2 - 1999 application season

1. Methods

a. Pesticide sampling

- (1) Consider AB1807 type sampling or high volume samplers, glass fiber filter/XAD resin - a single sample can be extracted for most of the pesticides
- (2) GC/MS analysis
 - (a) consider MS/MS analysis
- (3) Sample for most of 23 pesticides
 - (a) give priority to pesticides which were not sampled for in Pesticide Subset I
- (4) Consider monitoring for selected pesticides for intervals less than 24 hours to identify transient peak concentrations following application

b. Two months - probably May, June, but allow for influence of 1996 use

data and meteorological studies to make final decision

c. 4 d/week, 8 weeks, 5-7 samplers arrayed mostly along west edge, one interior, one north edge

d. Concurrent meteorological data will be collected at the H St. site and should be collected from at least one other sampling location. Any meteorological studies proposed by the Inversion Subgroup and endorsed by the LIAWG should be run concurrent with the monitoring.

III. Associated recommendations

A. Obtain 1996 pesticide use report information from Department of Pesticide Regulation to update ranked pesticide list and use maps.

B. Santa Barbara County Agricultural Commissioner coordinate with monitoring personnel to provide Notice of Intent and use information in a timely basis. Eighteen-hour lead time needed for charcoal tube set up to monitor for MITC and methyl bromide. Use information needed for each two month sampling period within 40 days after end of sampling period.

C. Persons knowledgeable in chemical analytical procedures be utilized to oversee the methods development for Pesticide Subset 2, whether such methods are developed under contract or within the existing state government laboratory services.

IV. Additional comments from LIAWG

A. These recommendations have been made without regard to cost, policy, or availability of personnel to conduct field monitoring or laboratory analysis. The two stage approach, however, was influenced by ARB and DFA laboratory methods availability. If monitoring for Pesticide Subset 2 monitoring can be accomplished in the 1998 use season, then that would be the preferred study plan.

B. These plans were drafted without emphasis on explaining specific health effects. The ES needs to develop a process for risk evaluation and risk communication for the interpretation of monitoring results. The toxicity approach in the ranking scheme utilized a variety of toxicity endpoints including acute and chronic toxicity, cancer potential, reproductive/developmental toxicology, neurological toxicity, and respiratory toxicity.

C. The list of ranked pesticides presented in January underwent two minor changes with some corrections in the use data for cypermethrin and benomyl which lowered their ranking. The top half of the ranked pesticide list is presented below.

Active ingredient	Rank
metam-sodium/MITC	22
methyl bromide	20
maneb/ETU	19
dimethoate	16
oxydemeton-methyl	16
chlorothalonil	15
acephate	14
methomyl	14
propryzamide	14
permethrin	13
chlorpyrifos	13
disulfoton	13
iprodione	13
fosetyl-aluminum	12
diazinon	12
fonofos	12
chlorthal-dimethyl (Dacthal)	12
sulfur	11
fenamiphos	11
alachlor	11
chloropicrin	11
mancozeb/ETU	10.5
benomyl	10