Air Resources Board

Terry Tamminen
Agency Secretary

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Arnold Schwarzenegger
Governor

TO: John Sanders, Ph.D., Chief
Environmental Monitoring Branch
Department of Pesticide Regulation

FROM: Jeff Cook, Chief
Quality Management Branch
Monitoring and Laboratory Division

DATE: January 15, 2004

SUBJECT: FINAL REPORT FOR THE 200 APPLICATION AIR MONITORING FOR CHLOROTHALONIL AND METHAMIDOPHOS IN SAN JOAQUIN COUNTY

Attached is the final report "Ambient Air Monitoring for Chlorothalonil and Methamidophos in San Joaquin County –Summer 2002." The report and separate volume of appendices for the report have also been forwarded to Randy Segawa and Shifang Fan of your staff. We received your July 9, 2003, comments and have made the requested changes.

If you or your staff have questions or need further information, please contact me at (916) 322-3726 or Kevin Mongar at (916) 322-2449.

Attachment/Separate Appendices

cc: See next page

California Environmental Protection Agency

Air Resources Board

State of California
California Environmental Protection Agency
AIR RESOURCES BOARD

Air Monitoring
Around an Application
of Chlorothalonil and Methamidophos
in San Joaquin County
Summer 2002

Prepared by
Operations Planning and Assessment Section
Quality Management Branch
Monitoring and Laboratory Division

Project No. P-02-002

November 24, 2003

Executive Summary

Application Air Monitoring for Chlorothalonil and Methamidophos in San Joaquin County – Summer 2002

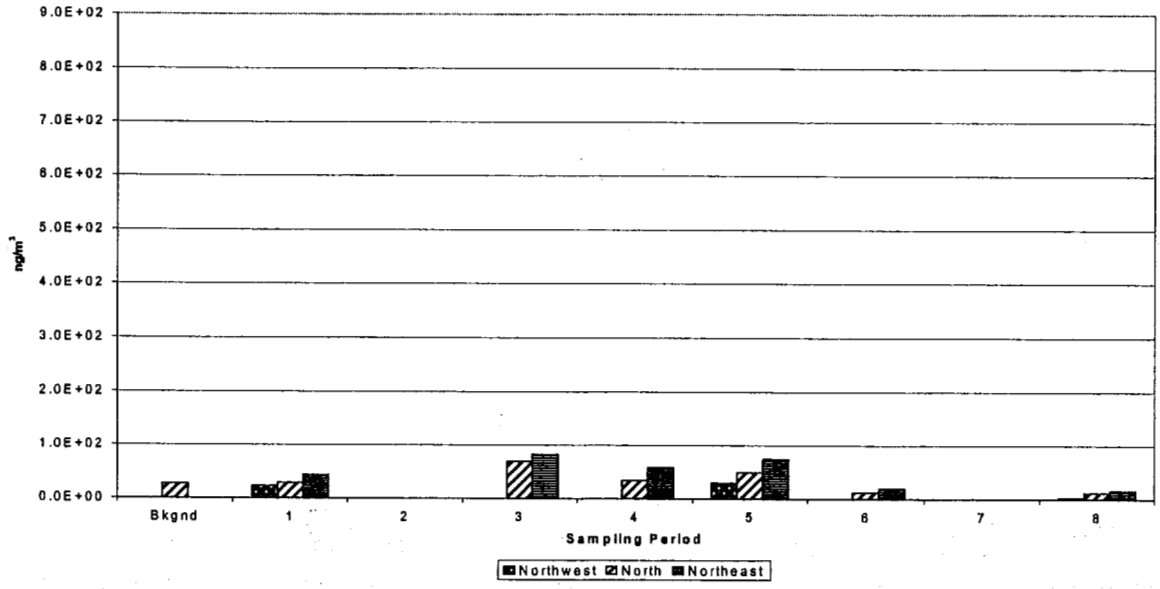
This report presents the results of air monitoring during an application of chlorothalonil and methamidophos on tomatoes conducted in San Joaquin County from September 2, 2002 through September 6, 2002 at the request of the California Department of Pesticide Regulation (DPR). California growers primarily use chlorothalonil on tomatoes, potatoes, onions, celery, carrots and garlic as a fungicide. Methamidophos is an insecticide used to control a variety of plant and soil insects.

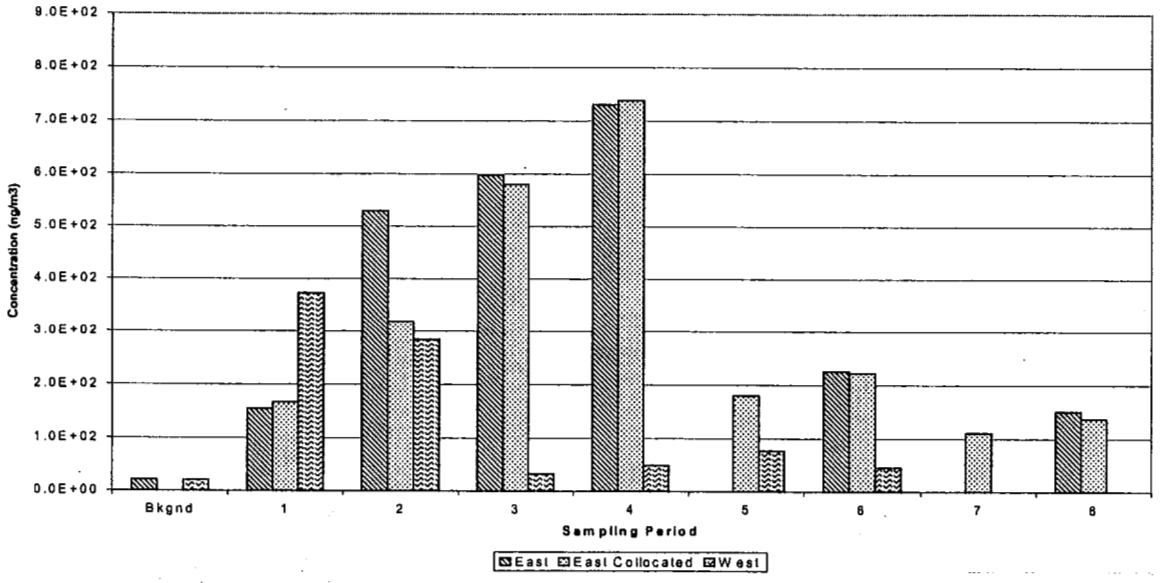
The monitoring included samples collected for one background period (i.e., samples collected around the field prior to the application) and eight sampling periods during and after the one-day application. Nine samplers were positioned around the field, one on each side, one in each corner and one collocated on the downwind side.

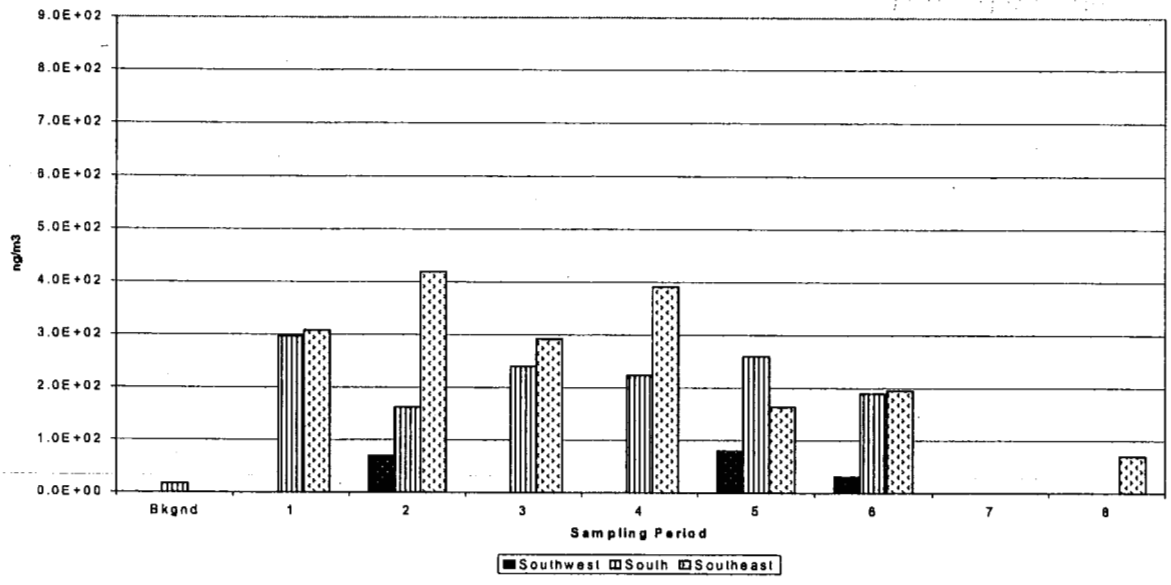
Of the 72 application samples collected (spikes, blanks, and background samples excluded), 51 of the 59 valid sample results for chlorothalonil were found to be above the estimated quantitation limit (EQL) and eight (8) were above the method detection limit (MDL) but below the EQL ("detected" or "Det"). Thirteen (13) samples were invalidated due to sampling problems. For the methamidophos samples, 34 of the 59 valid results were above the EQL, 22 were below the method detection limit (<MDL), three were above the MDL but below the EQL ("detected" or "Det") and thirteen (13) samples were invalidated due to sampling problems. The highest concentration of chlorothalonil, 740 ng/m^3 (68 pptv), was observed at the East sampling site (collocated sampler) during the fourth sampling period (from three to six hours post application). The highest concentration of methamidophos, 890 ng/m^3 (150 pptv), also occurred at the East sampling site (collocated sampler) but during the second sampling period (one hour sample post application). All results are displayed in graphs at the end of this summary.

Four samples were collected for each of the two pesticides (C = chlorothalonil and M = methamidophos in labeling) during background periods, one each from the east (EC and EM), north (NC and NM), west (WC and WM), and south (SC and SM) sites. In the background period all results for chlorothalonil were above the EQL with the highest concentration of 27 ng/m^3 found at the north site. Results of all background samples collected for methamidophos were <MDL.

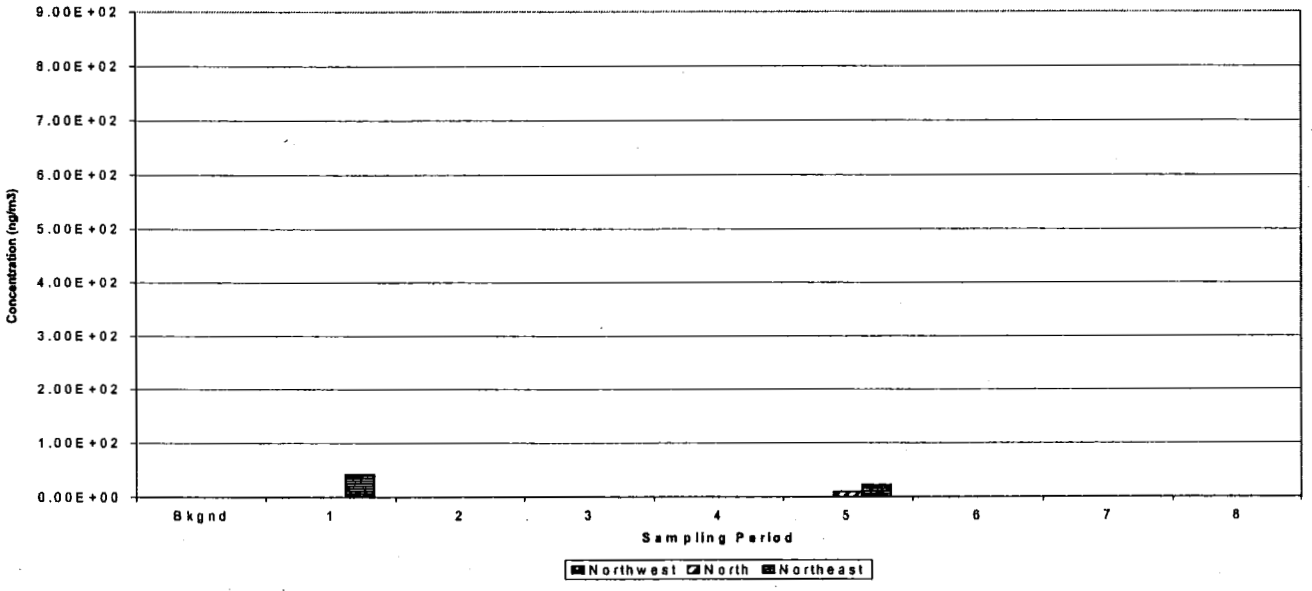
Chlorothalonil Results

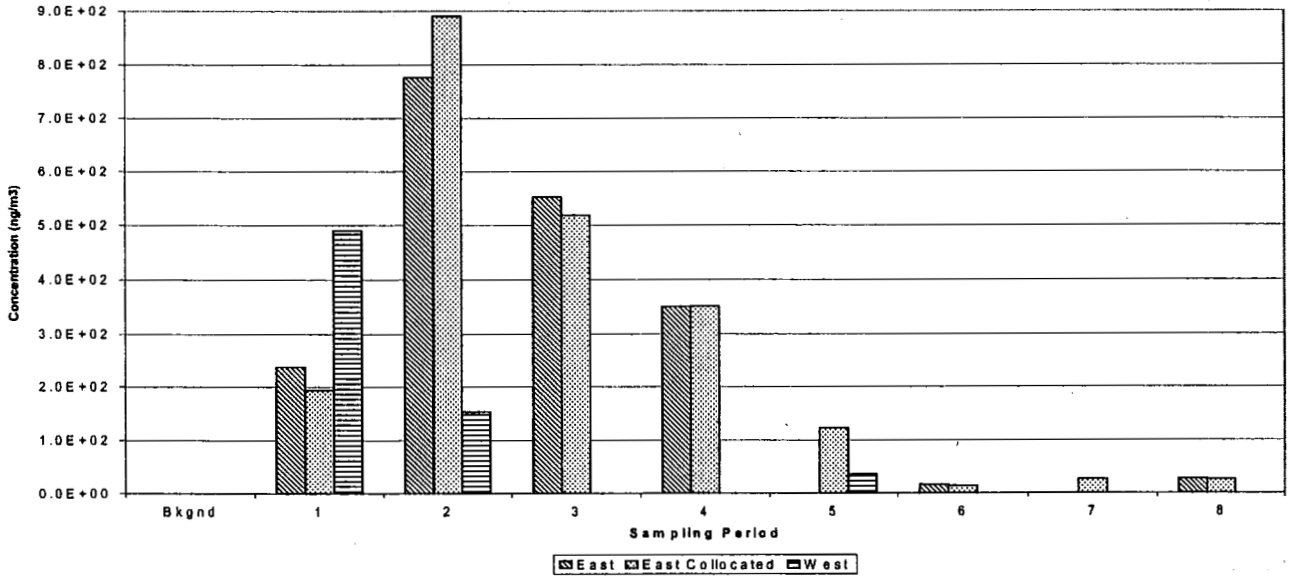


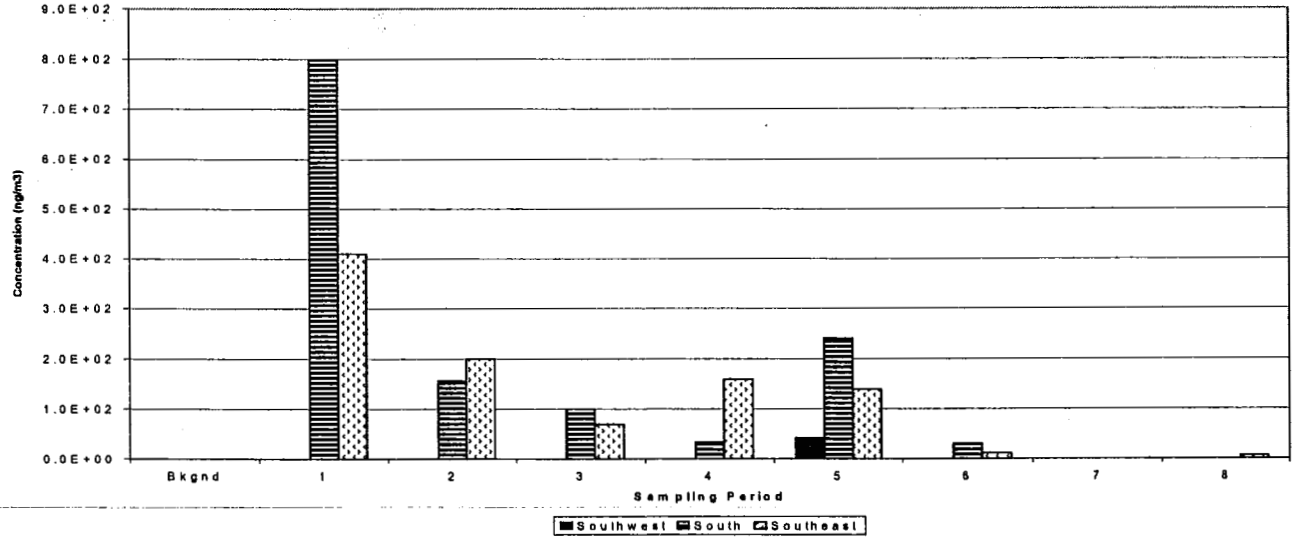




Methamidophos Results







Acknowledgments

Assistance in sampling site selection was provided by Mr. Gary Stockel of the San Joaquin County Agricultural Commissioner's Office. Staff of the Air Resources Board (ARB) Air Quality Surveillance Branch (AQSB) collected the ambient samples. Mr. Steve Rider of the AQSB coordinated the field work. Mr. Mike Orbanosky, Ms. Theresa Houston, and Mr. Jim Omand of the ARB Special Analysis Section of the MLD performed the method development and chemical analyses. Ms. Kathy Gill of the Operations Planning & Assessment Section prepared the monitoring report. Mr. Lynn Baker of the ARB Stationary Source Division provided comments on the monitoring protocol and report.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES
TABLE OF CONTENTS

I. Monitoring Report Approval

Air Monitoring during Application of Chlorothalonil and Methamidophos in San Joaquin County - Summer 2002

Project Lead: Kevin Mongar, Air Pollution Specialist, Monitoring and Laboratory Division

Prepared by: Kathy Gill, Air Pollution Specialist, Monitoring and Laboratory Division

Approval: The following monitoring report has been reviewed and approved by the Monitoring and Laboratory Division.

Jeffrey P. Cook, Chief
Quality Management Branch — 1.13.04 date

Kenneth R. Stroud, Chief
Air Quality Surveillance Branch — 1/14/04 date

Michael Poore, Chief
Northern Laboratory Branch — 1/13/04 date

William V. Loscutoff, Chief
Monitoring and Laboratory Division — 1.14.04 date

Air Monitoring Around an Application of Chlorothalonil and Methamidophos in San Joaquin County - Summer 2002

II. Introduction

At the request of the California Department of Pesticide Regulation (DPR) (January 2, 2002 Memorandum, Helliker to Lloyd), the Air Resources Board (ARB) staff determined airborne concentrations of the pesticides chlorothalonil and methamidophos during and for approximately three days following an application. The study was conducted in San Joaquin County between September 2, 2002 and September 6, 2002. This monitoring was done to fulfill the requirements of Assembly Bill 1807/3219 (Food and Agricultural Code, Division 7, Chapter 3, Article 1.5) which requires the ARB "to document the level of airborne emissions...of pesticides which may be determined to pose a present or potential hazard..." when requested by the DPR. This report presents the results of air monitoring around an application of chlorothalonil and methamidophos on tomatoes. California growers primarily use chlorothalonil on tomatoes, potatoes, onions, celery, carrots and garlic as a fungicide. A six-week ambient air monitoring study for chlorothalonil and another six week study for acephate and methamidophos were also conducted in Fresno County and are being reported separately.

The grower participating in this study applied both chlorothalonil and methamidophos to the field in a single application so this report addresses both pesticides. DPR had requested that application monitoring studies be conducted for both chlorothalonil and methamidophos. Methamidophos is an insecticide used to control a variety of plant and soil insects.

The sampling and analysis followed the procedures outlined in 1) the monitoring protocol, 2) the quality assurance guidelines described in the "Quality Assurance Plan for Pesticide Air Monitoring" (May 11, 1999 version), 3) the procedures described in the "Standard Operating Procedure for Sampling and Analysis of Methamidophos and Acephate in Ambient and Application Air Monitoring Using Gas Chromatography with a Nitrogen-Phosphorus Detector and a Flame Photometric Detector" and, 4) "Standard Operating Procedure Sampling and Analysis of 2,4,5,6-tetrachloro-1,3-benzenedicarbonitrile (Chlorothalonil) in Ambient Air". These documents are included in a separate volume of Appendices to this report.

III. Sampling

Air samples were collected by passing a measured volume of ambient air through XAD-2 resin. Both chlorothalonil and methamidophos were collected on the same cartridge. The sampling manifold is shown in Figure 1 of the protocol (Appendix I, page 11). The exposed XAD-2 resin tubes (SKC #226-30-06) were stored in an ice chest (on dry ice) or in a freezer until desorbed with dichloromethane. The tubes are 8 mm x 110 mm with 400 mg XAD-2 in the primary section and 200 mg in the secondary section. The flow rate of 3.0 standard liters per minute (slpm) was accurately measured and the sampling system operated for various times before, during and after the application (Table 1).

The exact operating interval for each sample was recorded in the logbook and is listed on the result tables. The tubes were protected from direct sunlight and positioned 1.5 meters above the ground for the application monitoring. At the end of each sampling period, the tubes were placed in culture tubes with an identification label affixed. Subsequent to sampling, the sample tubes were transported on dry ice, as soon as reasonably possible, to the ARB Monitoring and Laboratory Division laboratory for analysis. The samples were stored in the freezer or extracted and analyzed immediately.

A. Sampling Equipment

Each sampler consisted of an adsorbent tube, Teflon fittings and tubing, rain/sun shield, needle valve, support, and a 12 volt DC vacuum pump. Tubes were prepared for use by breaking off the sealed glass ends and immediately inserting the tube into the Teflon fitting. The tubes were oriented in the sampler according to a small arrow printed on the side indicating the direction of flow. A needle valve with a range of 0.5-4.0 standard liters per minute (slpm) was used to control sample flow rate. The flow rates were set using a calibrated digital mass flow meter (MFM), scaled from 0-5 slpm, before the start of each sampling period. The flow rate was also checked and recorded, using the MFM, at the end of each sampling period. Samplers were leak checked prior to each sampling period, with the sampling tubes installed. Any change in flow rates was recorded on the field log sheet. The pesticide sampling procedures for adsorbent tubes are included in the protocol found in Appendix I (Attachment IV, page 55).

Caution was used during field monitoring, transportation, storage, and lab analysis to minimize exposure of samples to sunlight in order to prevent photodegradation of the pesticides.

B. Application Monitoring

The DPR's monitoring recommendation (February 21, 2002 memo, Sanders to Cook, *Air Monitoring Recommendations for Acephate, Chlorothalonil, and Methamidophos in Field and for Sulfuryl Fluoride and Chloropicrin in Structural Fumigation*) suggested that application-site air monitoring be conducted at sites and dates chosen in consultation with the County agricultural commissioner. Ideally, monitoring was to be conducted at a site using the maximum allowed use rates, one pound methamidophos active ingredient per acre and five pounds chlorothalonil active ingredient per acre depending on crop type and pest to be controlled. The sampling schedule recommended by the DPR consisted of samples collected during daylight and overnight periods as shown below in Table 1.

A tomato field, approximately 35 acres, in San Joaquin County was chosen as the application-monitoring site. Refer to Figure 1 for a diagram of the application site and surrounding area. Eight samplers were positioned around the field, one on each side and one in each corner. A ninth sampler was collocated at the east (E/EC) position (downwind). See Figure 2 for a diagram of sampler positions. Background (before

application) samples were collected for 24 hours. Refer to Appendix V (page 86) for a copy of the notice of intent to apply restricted materials. Table 2 summarizes the application information.

Table 1 Application Sampling Schedule Guide

Sample period begins:	Sample duration time
Background (pre-application)	24 hours if possible; minimum 12 hours (if <24 hours must meet 24-hour Target EQL)
During application	Length of application
End of application	1 hour
1 hour post application	2 hours
3 hours post application	3 hours (or up to 1 hour before sunset)
6 hours post application	6 hours (or up to 1 hour before sunset)
1 hour before sunset	Overnight (until 1 hour after sunrise)
1 hour after sunrise	Daytime (until 1 hour before sunset)
1 hour before sunset	Overnight (until 1 hour after sunrise)
1 hour after sunrise	24 hours (until 1 hour after sunrise)

Table 2 Application Information

Location:	San Joaquin County, N. Mariposa Rd. at Kaiser Road
Range/Township/Section:	7E/1N/23SE (per maps) (8E/1N/16 per attached NOI)
Field Size:	Approximately 35 acres
Product Applied:	Monitor 4 (A.I. = methamidophos) Bravo Weather-Stik (A.I. = chlorothalonil)
Type of Application:	Ground spray
Commodity:	Tomatoes
Application Rate:	2.0 pints per acre Monitor 4 (1 lb. A.I./acre) and 3.0 pints per acre Bravo Weather-Stik (3 lbs. A.I./acre)
Grower/Applicator:	Triple E Farms/Tom Guido

The samplers were located at approximately 60-70 feet from the edge of the field on the sides and corners except the East side and Southeast corner at which samplers were 100 feet from the edge and the West side sampler at 25 feet from the edge of the field.

Table 3 lists the GPS coordinates of the field corners and sampling locations. All sampler inlets were approximately 1.5 meters above the ground. All samplers were at the same elevation relative to the field.

The ground spray application started at the southwest corner and passes were made from the east side to the west side and back, progressing northward.

Table 3 Field Corners and Sampler Waypoints

Field Corners:	
NEC/NEM:	Northeast Corner
SEC/SEM:	Southeast Corner
SWC/SWM:	Southwest Corner
NWC/NWM:	Northwest Corner
Sampler Positions:	**Waypoints:**
NC/NM	N 37° 55.203', W 121° 10.098'
NEC/NEM	N 37° 55.203', W 121° 09.969'
EC/EM	N 37° 55.080', W 121° 09.950'
SEC/SEM	N 37° 54.969', W 121° 09.950'
SC/SM	N 37° 54.972', W 121° 10.088'
SWC/SWM	N 37° 54.970', W 121° 10.224'
WC/WM	N 37° 55.093', W 121° 10.221'
NWC/NWM	N 37° 55.198', W 121° 10.223'
MET	N 37° 55.020', W 121° 10.224'

Note: For sample identification, the last letter, C or M, refers to the compound monitored (i.e., C = chlorothalonil, M = methamidophos). The preceding letter(s) indicate the sampler position (i.e., N = north, S = south, etc.) relative to the field.

Background samples were taken at the WC/WM, NC/NM, EC/EM and SC/SM positions to establish if any chlorothalonil or methamidophos was detectable in the air before the application (i.e., from nearby applications). The background samples were collected from an average start time of 0715 until 0630, September 2 to 3, 2002 (23 hours). Table 4 lists the approximate sampling periods.

Table 4 Application Sampling Periods

Period	**Approx. # Hours**	**Date**	**Approx.Time**
Background	23 1/4 hours	09/02-09/03/02	0715 to 0630
1 (Application)	2 3/4 hours	09/03/02	910 to 1200
2 (post application)	1 hour	09/03/02	1155 to 1300
3 (post application)	2 hours	09/03/02	1300 to 1500
4 (post application)	3 hours	09/03/02	1500 to 1755
5 (overnight)	13 1/4 hours	09/03-09/04/02	1755 to 0715
6 (daytime)	11 hours	09/04/02	0715 to 1810
7 (overnight)	13 hours	09/04-09/05/02	1810 to 0710
8 (24 hours)	23 1/2 hours	09/05-09/06/02	0715 to 0650

Note: Sample filter changeout took approximately one hour to complete all sites. Therefore sampling start and stop times had a one hour range between the first site and the last site. Approximate times in Table 4 are average times for all sites.

The meteorological station (oriented toward true north) was positioned 250 feet north of the southwest corner of the field. The meteorological station was positioned at a height of 21 feet to determine wind speed and direction, air temperature, barometric pressure and relative humidity. Appendix VI (page 89) lists the meteorological data in 15-minute averages for the test period. The raw meteorological data is available on a 1.44 MB diskette in comma delimited text format. ARB staff noted the degree of cloud cover on the sample log sheet whenever sample cartridges were changed. The conditions were clear during the entire study period.

IV. Analytical Methodology

The sampling and analysis method and validation results for chlorothalonil and methamidophos are included in Appendices II, III and IV, pages 58 - 85. The chlorothalonil method consists of sampling with XAD-2 resin cartridges followed by gas chromatography (GC) analysis with mass selective detector. The methamidophos method consists of sampling with XAD-2 resin cartridges followed by GC analysis with a flame photometric detector. The method detection limits were calculated following the analysis of seven low-level matrix spikes per 40 CFR, Part 136, Appendix B. The method detection limit (MDL) and estimated quantitation limit (EQL) for chlorothalonil were calculated by the lab staff as 1.93 nanograms per sample (ng/sample) and 9.66 ng/sample, respectively, and the MDL and EQL for methamidophos as 3.68 ng/sample and 18.4 ng/sample, respectively. For ease in standards preparation, the laboratory used 15 ng/sample (5.0 ng/m^3), the lower calibration standard, as the reporting EQL for methamidophos.

The DPR recommended target EQL for this study was 50 ng/m^3 for methamidophos and 1.0 ng/m^3 for chlorothalonil. The EQLs achieved by the laboratory were 4.28 ng/ m^3 and 2.25 ng/m^3 respectively, based on 4.3 m^3 of air collected (24 hours at 3.0 slpm). Results equal to or above the MDL but below the EQL were reported as detected (Det). Laboratory results, in units of ng/sample, equal to or above the EQL were reported to 3 significant figures. The laboratory results are included in Tables 5 through 8. The Northern Laboratory Branch in Sacramento performed the analyses.

V. Application Monitoring Results

Wind speed and direction 'wind roses' for each of the sampling periods are shown in Figures 3 through 11. Sample results for each sampling site, for each period, are included on the 'wind roses' (i.e., positioned with correct direction orientation relative to the wind rose).

Tables 5 and 6 present the results of application air monitoring for chlorothalonil and methamidophos in units of ng/m^3 and parts per trillion by volume (pptv). These tables include sampling times and duration as well as volumes of air sampled. A summary of only the concentration results is presented in Tables 7 and 8 for chlorothalonil and methamidophos, respectively. The monitoring study included one background period and eight sampling periods.

The equations used to convert chloropicrin and methamidophos air concentration results from units of ng/m^3 to units of pptv at 1 atmosphere and 25 °C are shown below:

$$\text{Chlorothalonil pptv} = (\text{ng/m}^3) \times \frac{(0.0820575 \text{ liter-atm/mole-°K})(298\text{°K})}{(1 \text{ atm})(265.9 \text{ gram/mole})} = (0.0920) \times (\text{ng/m}^3)$$

$$\text{Methamidophos pptv} = (\text{ng/m}^3) \times \frac{(0.0820575 \text{ liter-atm/mole-°K})(298\text{°K})}{(1 \text{ atm})(141.1 \text{ gram/mole})} = (0.1732) \times (\text{ng/m}^3)$$

Four samples were collected for the background period (i.e., prior to application) from the east (EC/EM), north (NC/NM), west (WC/WM) and south (SC/SM) sites. During the background sampling period, all of the methamidophos results were below the method detection limit and all of the chlorothalonil results were above the EQL. Concentrations of chlorothalonil during background sampling ranged from 17 to 27 ng/m^3. The highest background concentration, 27 ng/m^3, was found at the north site.

Of the 72 application samples collected (spikes, blanks, and background samples excluded), thirteen were invalidated. Fifty-one (51) of the 59 valid chlorothalonil results were found to be above the EQL and eight (8) chlorothalonil sample results were above the MDL but below the EQL and were reported as "Det". The highest chlorothalonil concentration, 740 ng/m^3 (68 pptv), was observed at the East collocated sampling site (EC-4C) during the 4th sampling period (three hours post application).

Thirty-four (34) of the 59 valid methamidophos sample results were above the EQL. Three methamidophos sample results were above the MDL but below the EQL and were reported as "Det" and twenty-two (22) methamidophos sample results were <MDL. The highest methamidophos concentration, 890 ng/m^3 (150 pptv), was observed at the East collocated sampling site (EM-2C) during the 2nd sampling period (one hour post application).

Thirteen (13) samples were invalidated for both chlorothalonil and methamidophos due to a sampling problem such as low batteries or inconsistent flow rates. No sample results have been adjusted or corrected for recoveries of quality assurance spike samples.

VI. Field Quality Assurance

Field quality assurance for the application monitoring included the following:

A. Trip Blank

One trip blank each for chlorothalonil and methamidophos was obtained, labeled, recorded on the field log-sheet, and transported along with the field spikes and application samples.

B. Collocated Samples

Collocated (replicate) samples were collected for all sampling periods (except the background period) at one sampling location (EC/EM).

C. Laboratory Spikes

Four lab spikes for methamidophos and thirteen lab spikes for chlorothalonil prepared at the same level as the field and trip spikes. The lab spikes remained in the laboratory freezer and were extracted and analyzed along with the field and trip spikes.

D. Trip Spikes

Four trip spikes each for chlorothalonil and methamidophos prepared at the same level as the field spikes. The trip spikes were labeled, recorded on the field log-sheet, and transported along with the field spikes and application samples.

E. Field Spikes

Four field spikes each for chlorothalonil and methamidophos obtained by sampling ambient air at the application monitoring site. The field spikes were obtained by sampling ambient air during the background monitoring (i.e., collocated with a background sample at the same environmental and experimental conditions).

VII. Quality Assurance Results

A. Trip Blanks

The application trip blank results were <MDL for both chlorothalonil and methamidophos.

B. Application Background Sample Results

Samples were collected from the following sites prior to pesticide application for background information: east (EC/EM), north (NC/NM), west (WC/WM) and south (SC/SM) sites. All background samples for methamidophos were <MDL. For chlorothalonil, all background concentrations were above the EQL and ranged from 17 ng/m^3 at the SC site to 27 ng/m^3 at the NC site.

Table 5 Chlorothalonil Application Results

Log #	Sample ID	Start Date/Time	End Date/Time	Time (min)	Time (hours)	Volume (m3)	Chlorothalonil (ng/sample)	(ng/m3)	*(pptv)	Comments
1	SCB-FS	9/2/02 6:47	9/3/02 6:00	1393	23.2	4.18	3.95E+02	9.5E+01	8.7E+00	Field Spike
2	SCB	9/2/02 6:47	9/3/02 6:00	1393	23.2	4.18	7.19E+01	1.7E+01	1.6E+00	
3	WCB-FS	9/2/02 7:01	9/3/02 6:21	1400	23.3	4.20	4.02E+02	9.6E+01	8.8E+00	Field Spike
4	WCB	9/2/02 7:01	9/3/02 6:21	1400	23.3	4.20	8.40E+01	2.0E+01	1.8E+00	
5	NCB-FS	9/2/02 7:20	9/3/02 6:39	1399	23.3	4.20	3.73E+02	8.9E+01	8.2E+00	Field Spike
6	NCB	9/2/02 7:20	9/3/02 6:39	1399	23.3	4.20	1.14E+02	2.7E+01	2.5E+00	
7	ECB-FS	9/2/02 7:48	9/3/02 7:00	1392	23.2	4.18	4.20E+02	1.0E+02	9.3E+00	Field Spike
8	ECB	9/2/02 7:48	9/3/02 7:00	1392	23.2	4.18	8.65E+01	2.1E+01	1.9E+00	
9	ECB-TS	9/2/02 20:00	NA	NA	NA	NA	1.82E+02	NA	NA	Trip Spike
10	SC-1	9/3/02 8:54	9/3/02 11:24	150	2.5	0.45	1.33E+02	3.0E+02	2.7E+01	
11	SWC-1	9/3/02 9:00	9/3/02 11:33	153	2.5	0.46	Det	Det	Det	
12	WC-1	9/3/02 9:07	9/3/02 11:40	153	2.5	0.46	1.71E+02	3.7E+02	3.4E+01	
13	NWC-1	9/3/02 9:07	9/3/02 11:47	160	2.7	0.48	1.11E+01	2.3E+01	2.1E+00	
14	NC-1	9/3/02 9:09	9/3/02 11:53	164	2.7	0.49	1.41E+01	2.9E+01	2.6E+00	
15	NEC-1	9/3/02 9:13	9/3/02 11:59	166	2.8	0.50	2.19E+01	4.4E+01	4.1E+00	
16	EC-1	9/3/02 9:16	9/3/02 12:08	172	2.9	0.52	7.98E+01	1.5E+02	1.4E+01	
17	EC-1C	9/3/02 9:16	9/3/02 12:07	171	2.9	0.51	8.55E+01	1.7E+02	1.5E+01	Collocated
18	SEC-1	9/3/02 9:20	9/3/02 12:20	180	3.0	0.54	1.66E+02	3.1E+02	2.8E+01	
19	SC-2	9/3/02 11:25	9/3/02 12:32	67	1.1	0.20	3.25E+01	1.6E+02	1.5E+01	
20	SWC-2	9/3/02 11:35	9/3/02 12:41	66	1.1	0.20	1.40E+01	7.0E+01	6.5E+00	
21	WC-2	9/3/02 11:42	9/3/02 12:50	68	1.1	0.20	5.82E+01	2.9E+02	2.6E+01	
22	NWC-2	9/3/02 11:48	9/3/02 12:57	69	1.1	0.21	Det	Det	Det	
23	NC-2	9/3/02 11:53	9/3/02 13:05	72	1.2	0.22	Det	Det	Det	
24	NEC-2	9/3/02 12:00	9/3/02 13:10	70	1.2	0.21	Det	Det	Det	
25	EC-2	9/3/02 12:13	9/3/02 13:19	66	1.1	0.20	1.05E+02	5.3E+02	4.9E+01	

MDL = 1.93 ng/sample
EQL = 9.66 ng/sample
DET = value is below EQL but $\geq$ MDL

NA = not applicable
*pptv = at 1 atm. and 25° C

Table 5 (cont.) Chlorothalonil Application Results

Log #	Sample ID	Start Date/Time	End Date/Time	Time (min)	Time (hours)	Volume (m3)	Chlorothalonil (ng/sample)	(ng/m3)	*(pptv)	Comments
26	EC-2C	9/3/02 12:13	9/3/02 13:22	69	1.1	0.21	6.61E+01	3.2E+02	2.9E+01	Collocated
27	SEC-2	9/3/02 12:21	9/3/02 13:30	69	1.2	0.21	8.68E+01	4.2E+02	3.9E+01	
28	SC-3	9/3/02 12:34	9/3/02 14:36	122	2.0	0.37	8.78E+01	2.4E+02	2.2E+01	
29	SWC-3	9/3/02 12:43	9/3/02 14:44	121	2.0	0.36	Det	Det	Det	
30	WC-3	9/3/02 12:51	9/3/02 14:51	120	2.0	0.36	1.18E+01	3.3E+01	3.0E+00	
31	NWC-3	9/3/02 12:59	9/3/02 14:57	118	2.0	0.35	Det	Det	Det	
32	NC-3	9/3/02 13:06	9/3/02 15:04	118	2.0	0.35	2.45E+01	6.9E+01	6.4E+00	
33	NEC-3	9/3/02 13:13	9/3/02 15:10	117	2.0	0.35	2.90E+01	8.3E+01	7.6E+00	
34	EC-3	9/3/02 13:23	9/3/02 15:18	115	1.9	0.34	2.06E+02	6.0E+02	5.5E+01	
35	EC-3C	9/3/02 13:25	9/3/02 15:23	118	2.0	0.35	2.05E+02	5.8E+02	5.3E+01	Collocated
36	SEC-3	9/3/02 13:32	9/3/02 15:30	118	2.0	0.35	1.03E+02	2.9E+02	2.7E+01	
37	SC-4	9/3/02 14:36	9/3/02 17:23	167	2.8	0.50	1.12E+02	2.2E+02	2.1E+01	
38	SWC-4	9/3/02 14:44	9/3/02 17:32	168	2.8	0.50	Det	Det	Det	
39	WC-4	9/3/02 14:52	9/3/02 17:40	168	2.8	0.50	2.48E+01	4.9E+01	4.5E+00	
40	NWC-4	9/3/02 14:59	9/3/02 17:48	169	2.8	0.51	Det	Det	Det	
41	NC-4	9/3/02 15:06	9/3/02 17:56	170	2.8	0.51	1.73E+01	3.4E+01	3.1E+00	
42	NEC-4	9/3/02 15:12	9/3/02 18:03	171	2.9	0.51	2.99E+01	5.8E+01	5.4E+00	
43	EC-4	9/3/02 15:19	9/3/02 18:12	173	2.9	0.52	3.79E+02	7.3E+02	6.7E+01	
44	EC-4C	9/3/02 15:24	9/3/02 18:17	173	2.9	0.52	3.83E+02	7.4E+02	6.8E+01	Collocated
45	SEC-4	9/3/02 15:31	9/3/02 18:24	173	2.9	0.52	2.03E+02	3.9E+02	3.6E+01	
46	SC-5	9/3/02 17:25	9/4/02 6:35	790	13.2	2.37	6.09E+02	2.6E+02	2.4E+01	
47	SWC-5	9/3/02 17:34	9/4/02 6:52	798	13.3	2.39	1.92E+02	8.0E+01	7.4E+00	
48	WC-5	9/3/02 17:42	9/4/02 7:04	802	13.4	2.41	1.84E+02	7.7E+01	7.0E+00	
49	NWC-5	9/3/02 17:49	9/4/02 7:14	805	13.4	2.42	7.10E+01	2.9E+01	2.7E+00	
50	NC-5	9/3/02 17:58	9/4/02 7:21	803	13.4	2.41	1.19E+02	4.9E+01	4.5E+00	
51	NEC-5	9/3/02 18:04	9/4/02 7:30	806	13.4	2.42	1.80E+02	7.4E+01	6.8E+00	
52	EC-5	9/3/02 18:14	9/4/02 7:40	806	13.4	INVALID	INVALID	INVALID	INVALID	Low Battery

MDL = 1.93 ng/sample
EQL = 9.66 ng/sample
DET = value is below EQL but ≥ MDL

NA = not applicable
*pptv = at 1 atm. and 25° C

Table 5 (cont.) Chlorothalonil Application Results

Log #	Sample ID	Start Date/Time	End Date/Time	Time (min)	Time (hours)	Volume (m3)	Chlorothalonil (ng/sample)	(ng/m3)	*(pptv)	Comments
53	EC-5C	9/3/02 18:18	9/4/02 7:47	809	13.5	2.43	4.36E+02	1.8E+02	1.7E+01	
54	SEC-5	9/3/02 18:25	9/4/02 7:57	812	13.5	2.44	3.98E+02	1.6E+02	1.5E+01	
55	SC-6-TS-1	9/4/02 5:20	NA	NA	NA	NA	1.92E+02	NA	NA	Trip Spike
56	SC-6-TS-2	9/4/02 5:20	NA	NA	NA	NA	1.88E+02	NA	NA	Trip Spike
57	SC-6-TS-3	9/4/02 5:20	NA	NA	NA	NA	2.38E+02	NA	NA	Trip Spike
58	SC-6-TB	9/4/02 5:30	NA	NA	NA	NA	<MDL	NA	NA	Trip Blank
59	SC-6	9/4/02 6:37	9/4/02 17:27	650	10.8	1.95	3.70E+02	1.9E+02	1.7E+01	
60	SWC-6	9/4/02 6:54	9/4/02 17:38	644	10.7	1.93	6.08E+01	3.1E+01	2.9E+00	
61	WC-6	9/4/02 7:07	9/4/02 17:54	647	10.8	1.94	8.85E+01	4.6E+01	4.2E+00	
62	NWC-6	9/4/02 7:15	9/4/02 18:03	648	10.8	INVALID	INVALID	INVALID	INVALID	Dead Battery
63	NC-6	9/4/02 7:24	9/4/02 18:11	647	10.8	1.94	2.38E+01	1.2E+01	1.1E+00	
64	NEC-6	9/4/02 7:32	9/4/02 18:19	647	10.8	1.94	3.70E+01	1.9E+01	1.8E+00	
65	EC-6	9/4/02 7:42	9/4/02 18:28	646	10.8	1.94	4.38E+02	2.3E+02	2.1E+01	
66	EC-6C	9/4/02 7:50	9/4/02 18:34	644	10.7	1.93	4.29E+02	2.2E+02	2.0E+01	Collocated
67	SEC-6	9/4/02 7:59	9/4/02 18:43	644	10.7	1.93	3.77E+02	1.9E+02	1.8E+01	
68	SC-7	9/4/02 17:30	9/5/02 6:43	793	13.2	INVALID	INVALID	INVALID	INVALID	Dead Battery
69	SWC-7	9/4/02 17:41	9/5/02 6:53	792	13.2	INVALID	INVALID	INVALID	INVALID	Low Battery
70	WC-7	9/4/02 17:58	9/5/02 7:02	784	13.1	INVALID	INVALID	INVALID	INVALID	Low Battery
71	NWC-7	9/4/02 18:06	9/5/02 7:09	783	13.1	INVALID	INVALID	INVALID	INVALID	Low Battery
72	NC-7	9/4/02 18:14	9/5/02 7:16	782	13.0	INVALID	INVALID	INVALID	INVALID	Dead Battery
73	NEC-7	9/4/02 18:23	9/5/02 7:25	782	13.0	INVALID	INVALID	INVALID	INVALID	Dead Battery
74	EC-7	9/4/02 18:32	9/5/02 7:34	782	13.0	INVALID	INVALID	INVALID	INVALID	Low Battery
75	EC-7C	9/4/02 18:38	9/5/02 7:42	784	13.1	2.35	2.61E+02	1.1E+02	1.0E+01	Collocated
76	SEC-7	9/4/02 18:47	9/5/02 7:50	783	13.1	INVALID	INVALID	INVALID	INVALID	Dead Battery
77	SC-8	9/5/02 6:45	9/6/02 6:24	1419	23.7	INVALID	INVALID	INVALID	INVALID	Dead Battery
78	SWC-8	9/5/02 6:55	9/6/02 6:24	1409	23.5	INVALID	INVALID	INVALID	INVALID	Dead Battery
79	WC-8	9/5/02 7:05	9/6/02 6:42	1417	23.6	INVALID	INVALID	INVALID	INVALID	Dead Battery

MDL = 1.93 ng/sample
EQL = 9.66 ng/sample
DET = value is below EQL but $\geq$ MDL
NA = not applicable
*pptv = at 1 atm. and 25° C

Table 5 (cont.) Chlorothalonil Application Results

Log #	Sample ID	Start Date/Time	End Date/Time	Time (min)	Time (hours)	Volume (m3)	Chlorothalonil (ng/sample)	(ng/m3)	*(pptv)	Comments
80	NWC-8	9/5/02 7:12	9/6/02 6:49	1417	23.6	4.25	1.26E+01	3.0E+00	2.7E-01	
81	NC-8	9/5/02 7:19	9/6/02 6:55	1416	23.6	4.25	4.98E+01	1.2E+01	1.1E+00	
82	NEC-8	9/5/02 7:28	9/6/02 7:02	1414	23.6	4.02	6.38E+01	1.6E+01	1.5E+00	Low Battery
83	EC-8	9/5/02 7:37	9/6/02 7:09	1412	23.5	3.77	5.68E+02	1.5E+02	1.4E+01	Low Battery
84	EC-8C	9/5/02 7:44	9/6/02 7:14	1410	23.5	4.23	5.81E+02	1.4E+02	1.3E+01	Collocated
85	SEC-8	9/5/02 7:53	9/6/02 7:20	1407	23.4	3.84	2.72E+02	7.1E+01	6.5E+00	Low Battery

MDL = 1.93 ng/sample NA = not applicable
EQL = 9.66 ng/sample *pptv = at 1 atm. and 25° C
DET = value is below EQL but ≥ MDL

Table 6 Methamidophos Application Results

Log #	Sample ID	Start Date/Time	End Date/Time	Time (min)	Time (hours)	Volume (m3)	Methamidophos (ng/sample)	(ng/m3)	*(pptv)	Comments
1	SMB-FS	9/2/02 6:47	9/3/02 5:59	1392	23.2	4.18	5.82E+02	1.4E+02	2.4E+01	Field Spike
2	SMB	9/2/02 6:47	9/3/02 5:59	1392	23.2	4.18	<MDL	<MDL	<MDL	
3	WMB-FS	9/2/02 7:01	9/3/02 6:19	1398	23.3	4.19	6.30E+02	1.5E+02	2.6E+01	Field Spike
4	WMB	9/2/02 7:01	9/3/02 6:19	1398	23.3	4.19	<MDL	<MDL	<MDL	
5	NMB-FS	9/2/02 7:20	9/3/02 6:38	1398	23.3	4.19	6.13E+02	1.5E+02	2.5E+01	Field Spike
6	NMB	9/2/02 7:20	9/3/02 6:38	1398	23.3	4.19	<MDL	<MDL	<MDL	
7	EMB-FS	9/2/02 7:49	9/3/02 6:59	1390	23.2	4.17	6.43E+02	1.5E+02	2.7E+01	Field Spike
8	EMB	9/2/02 7:49	9/3/02 6:59	1390	23.2	4.17	<MDL	<MDL	<MDL	
9	EMB-TS	9/2/02 20:00	NA	NA	NA	NA	7.25E+02	NA	NA	Trip Spike
10	SM-1	9/3/02 8:54	9/3/02 11:24	150	2.5	0.45	3.59E+02	8.0E+02	1.4E+02	
11	SWM-1	9/3/02 9:00	9/3/02 11:33	153	2.5	0.46	<MDL	<MDL	<MDL	
12	WM-1	9/3/02 9:07	9/3/02 11:40	153	2.5	0.46	2.25E+02	4.9E+02	8.5E+01	
13	NWM-1	9/3/02 9:07	9/3/02 11:47	160	2.7	0.48	<MDL	<MDL	<MDL	
14	NM-1	9/3/02 9:07	9/3/02 11:53	166	2.8	0.50	DET	DET	DET	
15	NEM-1	9/3/02 9:13	9/3/02 11:59	166	2.8	0.50	2.11E+01	4.2E+01	7.3E+00	
16	EM-1	9/3/02 9:16	9/3/02 12:08	172	2.9	0.52	1.22E+02	2.4E+02	4.1E+01	
17	EM-1C	9/3/02 9:16	9/3/02 12:07	171	2.9	0.51	9.95E+01	1.9E+02	3.4E+01	Collocated
18	SEM-1	9/3/02 9:20	9/3/02 12:20	180	3.0	0.54	2.21E+02	4.1E+02	7.1E+01	
19	SM-2	9/3/02 11:25	9/3/02 12:32	67	1.1	0.20	3.16E+01	1.6E+02	2.7E+01	
20	SWM-2	9/3/02 11:35	9/3/02 12:41	66	1.1	0.20	<MDL	<MDL	<MDL	
21	WM-2	9/3/02 11:42	9/3/02 12:50	68	1.1	0.20	3.13E+01	1.5E+02	2.7E+01	
22	NWM-2	9/3/02 11:48	9/3/02 12:57	69	1.1	0.21	<MDL	<MDL	<MDL	
23	NM-2	9/3/02 11:53	9/3/02 13:05	72	1.2	0.22	<MDL	<MDL	<MDL	
24	NEM-2	9/3/02 12:00	9/3/02 13:10	70	1.2	0.21	<MDL	<MDL	<MDL	
25	EM-2	9/3/02 12:13	9/3/02 13:19	66	1.1	0.20	1.54E+02	7.8E+02	1.3E+02	

MDL = 3.0 ng/sample
EQL = 15 ng/sample
DET = value is below EQL but $\geq$ MDL
NA = not applicable
*pptv = at 1 atm. and 25° C

Table 6 (cont.) Methamidophos Application Results

Log #	Sample ID	Start Date/Time	End Date/Time	Time (min)	Time (hours)	Volume (m3)	Methamidophos (ng/sample)	(ng/m3)	*(pptv)	Comments
26	EM-2C	9/3/02 12:13	9/3/02 13:22	69	1.1	0.21	1.84E+02	8.9E+02	1.5E+02	Collocated
27	SEM-2	9/3/02 12:21	9/3/02 13:30	69	1.2	0.21	4.15E+01	2.0E+02	3.5E+01	
28	SM-3	9/3/02 12:34	9/3/02 14:36	122	2.0	0.37	3.69E+01	1.0E+02	1.7E+01	
29	SWM-3	9/3/02 12:43	9/3/02 14:44	121	2.0	0.36	<MDL	<MDL	<MDL	
30	WM-3	9/3/02 12:51	9/3/02 14:51	120	2.0	0.36	<MDL	<MDL	<MDL	
31	NWM-3	9/3/02 13:13	9/3/02 15:10	117	2.0	0.35	<MDL	<MDL	<MDL	
32	NM-3	9/3/02 13:06	9/3/02 15:04	118	2.0	0.35	DET	DET	DET	
33	NEM-3	9/3/02 13:13	9/3/02 15:10	117	2.0	0.35	DET	DET	DET	
34	EM-3	9/3/02 13:23	9/3/02 15:18	115	1.9	0.34	1.91E+02	5.5E+02	9.6E+01	
35	EM-3C	9/3/02 13:25	9/3/02 15:23	118	2.0	0.35	1.84E+02	5.2E+02	9.0E+01	Collocated
36	SEM-3	9/3/02 13:32	9/3/02 15:30	118	2.0	0.35	2.50E+01	7.1E+01	1.2E+01	
37	SM-4	9/3/02 14:36	9/3/02 17:23	167	2.8	0.50	1.68E+01	3.4E+01	5.8E+00	
38	SWM-4	9/3/02 14:44	9/3/02 17:32	168	2.8	0.50	<MDL	<MDL	<MDL	
39	WM-4	9/3/02 14:52	9/3/02 17:40	168	2.8	0.50	<MDL	<MDL	<MDL	
40	NWM-4	9/3/02 14:59	9/3/02 17:48	169	2.8	0.51	<MDL	<MDL	<MDL	
41	NM-4	9/3/02 15:06	9/3/02 17:56	170	2.8	0.51	<MDL	<MDL	<MDL	
42	NEM-4	9/3/02 15:12	9/3/02 18:03	171	2.9	0.51	<MDL	<MDL	<MDL	
43	EM-4	9/3/02 15:19	9/3/02 18:12	173	2.9	0.52	1.82E+02	3.5E+02	6.1E+01	
44	EM-4C	9/3/02 15:24	9/3/02 18:17	173	2.9	0.52	1.82E+02	3.5E+02	6.1E+01	Collocated
45	SEM-4	9/3/02 15:31	9/3/02 18:24	173	2.9	0.52	8.31E+01	1.6E+02	2.8E+01	
46	SM-5	9/3/02 17:25	9/4/02 6:35	790	13.2	2.37	5.70E+02	2.4E+02	4.2E+01	
47	SWM-5	9/3/02 17:34	9/4/02 6:52	798	13.3	2.39	1.02E+02	4.3E+01	7.4E+00	
48	WM-5	9/3/02 17:42	9/4/02 7:04	802	13.4	2.41	8.77E+01	3.6E+01	6.3E+00	
49	NWM-5	9/3/02 17:49	9/4/02 7:14	805	13.4	2.42	<MDL	<MDL	<MDL	
50	NM-5	9/3/02 17:58	9/4/02 7:21	803	13.4	2.41	2.33E+01	9.7E+00	1.7E+00	
51	NEM-5	9/3/02 18:04	9/4/02 7:30	806	13.4	2.42	5.50E+01	2.3E+01	3.9E+00	
52	EM-5	9/3/02 18:14	9/4/02 7:40	806	13.4	INVALID	INVALID	INVALID	INVALID	Flow rate

MDL = 3.0 ng/sample
EQL = 15 ng/sample
DET = value is below EQL but ≥ MDL
NA = not applicable
*pptv = at 1 atm. and 25° C

Table 6 (cont.) Methamidophos Application Results

Log #	Sample ID	Start Date/Time	End Date/Time	Time (min)	Time (hours)	Volume (m3)	Methamidophos (ng/sample)	(ng/m3)	*(pptv)	Comments
53	EM-5C	9/3/02 18:18	9/4/02 7:47	809	13.5	2.43	2.97E+02	1.2E+02	2.1E+01	Collocated
54	SEM-5	9/3/02 18:25	9/4/02 7:57	812	13.5	2.44	3.40E+02	1.4E+02	2.4E+01	
55	SM-6-TS-1	9/4/02 5:20	NA	NA	NA	NA	5.59E+02	NA	NA	Trip Spike
56	SM-6-TS-2	9/4/02 5:20	NA	NA	NA	NA	4.81E+02	NA	NA	Trip Spike
57	SM-6-TS-3	9/4/02 5:20	NA	NA	NA	NA	5.04E+02	NA	NA	Trip Spike
58	SM-6-TB	9/4/02 5:30	NA	NA	NA	NA	<MDL	NA	NA	Trip Blank
59	SM-6	9/4/02 6:37	9/4/02 17:27	650	10.8	1.95	6.19E+01	3.2E+01	5.5E+00	
60	SWM-6	9/4/02 6:54	9/4/02 17:38	644	10.7	1.93	<MDL	<MDL	<MDL	
61	WM-6	9/4/02 7:07	9/4/02 17:54	647	10.8	1.94	<MDL	<MDL	<MDL	
62	NWM-6	9/4/02 7:15	9/4/02 18:03	648	10.8	INVALID	INVALID	INVALID	INVALID	Dead Battery
63	NM-6	9/4/02 7:24	9/4/02 18:11	647	10.8	1.94	<MDL	<MDL	<MDL	
64	NEM-6	9/4/02 7:32	9/4/02 18:19	647	10.8	1.94	<MDL	<MDL	<MDL	
65	EM-6	9/4/02 7:42	9/4/02 18:28	646	10.8	1.94	3.16E+01	1.6E+01	2.8E+00	
66	EM-6C	9/4/02 7:50	9/4/02 18:34	644	10.7	1.93	2.74E+01	1.4E+01	2.5E+00	Collocated
67	SEM-6	9/4/02 7:59	9/4/02 18:43	644	10.7	1.93	2.39E+01	1.2E+01	2.1E+00	
68	SM-7	9/4/02 17:30	9/5/02 6:43	793	13.2	INVALID	INVALID	INVALID	INVALID	Dead Battery
69	SWM-7	9/4/02 17:41	9/5/02 6:53	792	13.2	INVALID	INVALID	INVALID	INVALID	Low Battery
70	WM-7	9/4/02 17:58	9/5/02 7:02	784	13.1	INVALID	INVALID	INVALID	INVALID	Dead Battery
71	NWM-7	9/4/02 18:06	9/5/02 7:09	783	13.1	INVALID	INVALID	INVALID	INVALID	Dead Battery
72	NM-7	9/4/02 18:14	9/5/02 7:16	782	13.0	INVALID	INVALID	INVALID	INVALID	Dead Battery
73	NEM-7	9/4/02 18:23	9/5/02 7:25	782	13.0	INVALID	INVALID	INVALID	INVALID	Dead Battery
74	EM-7	9/4/02 18:32	9/5/02 7:34	782	13.0	INVALID	INVALID	INVALID	INVALID	Low Battery
75	EM-7C	9/4/02 18:38	9/5/02 7:42	784	13.1	2.35	6.28E+01	2.7E+01	4.6E+00	Collocated
76	SEM-7	9/4/02 18:47	9/5/02 7:50	783	13.1	INVALID	INVALID	INVALID	INVALID	Dead Battery
77	SM-8	9/5/02 6:45	9/6/02 6:24	1419	23.7	INVALID	INVALID	INVALID	INVALID	Dead Battery
78	SWM-8	9/5/02 6:55	9/6/02 6:24	1409	23.5	INVALID	INVALID	INVALID	INVALID	Dead Battery
79	WM-8	9/5/02 7:05	9/6/02 6:42	1417	23.6	INVALID	INVALID	INVALID	INVALID	Dead Battery

MDL = 3.0 ng/sample
EQL = 15 ng/sample
DET = value is below EQL but ≥ MDL
NA = not applicable
*pptv = at 1 atm. and 25° C

Table 6 (cont.) Methamidophos Application Results

Log #	Sample ID	Start Date/Time	End Date/Time	Time (min)	Time (hours)	Volume (m3)	Methamidophos (ng/sample)	(ng/m3)	*(pptv)	Comments
80	NWM-8	9/5/02 7:12	9/6/02 6:49	1417	23.6	4.25	<MDL	<MDL	<MDL	
81	NM-8	9/5/02 7:19	9/6/02 6:55	1416	23.6	4.25	<MDL	<MDL	<MDL	
82	NEM-8	9/5/02 7:28	9/6/02 7:02	1414	23.6	4.24	<MDL	<MDL	<MDL	Low Battery
83	EM-8	9/5/02 7:37	9/6/02 7:09	1412	23.5	3.78	1.04E+02	2.7E+01	4.8E+00	Low Battery
84	EM-8C	9/5/02 7:44	9/6/02 7:14	1410	23.5	4.23	1.10E+02	2.6E+01	4.5E+00	Collocated
85	SEM-8	9/5/02 7:53	9/6/02 7:20	1407	23.4	3.93	2.61E+01	6.6E+00	1.2E+00	Low Battery

MDL = 3.0 ng/sample
EQL = 15 ng/sample
DET = value is below EQL but $\geq$ MDL
NA = not applicable
*pptv = at 1 atm. and 25° C

Table 7 Summary of Chlorothalonil Application Results (ng/m^3)

Sampling Period	Approx. # Hours	East	East Coll.	Northeast	North	North West	West	South West	South	South East
Bkgnd	23.3	2.1E+01	NA	NA	2.7E+01	NA	2.0E+01	NA	1.7E+01	NA
1	2.7	1.5E+02	1.7E+02	4.4E+01	2.9E+01	2.3E+01	3.7E+02	Det	3.0E+02	3.1E+02
2	1.1	5.3E+02	3.2E+02	Det	Det	Det	2.9E+02	7.0E+01	1.6E+02	4.2E+02
3	2.0	6.0E+02	5.8E+02	8.3E+01	6.9E+01	Det	3.3E+01	Det	2.4E+02	2.9E+02
4	2.8	7.3E+02	7.4E+02	5.8E+01	3.4E+01	Det	4.9E+01	Det	2.2E+02	3.9E+02
5	13.4	INVALID	1.8E+02	7.4E+01	4.9E+01	2.9E+01	7.7E+01	8.0E+01	1.3E+02	1.6E+02
6	10.8	2.3E+02	2.2E+02	1.9E+01	1.2E+01	INVALID	4.6E+01	3.1E+01	1.9E+02	1.9E+02
7	13.1	INVALID	1.1E+02	INVALID	INVALID	INVALID	INVALID	INVALID	INVALID	INVALID
8	23.6	1.5E+02	1.4E+02	1.6E+01	1.2E+01	3.0E+00	INVALID	INVALID	INVALID	7.1E+01

EQL = 9.66 ng/sample
MDL = 1.93 ng/sample

Table 8 Summary of Methamidophos Application Results (ng/m^3)

Sampling Period	Approx. # Hours	East	East Coll.	Northeast	North	North West	West	South West	South	South East
Bkgnd	23.3	<MDL	NA	NA	<MDL	NA	<MDL	NA	<MDL	NA
1	2.7	2.4E+02	1.9E+02	4.2E+01	Det	<MDL	4.9E+02	<MDL	8.0E+02	4.1E+02
2	1.1	7.8E+02	8.9E+02	<MDL	<MDL	<MDL	1.5E+02	<MDL	1.6E+02	2.0E+02
3	2.0	5.5E+02	5.2E+02	Det	Det	<MDL	<MDL	<MDL	1.0E+02	7.1E+01
4	2.8	3.5E+02	3.5E+02	<MDL	<MDL	<MDL	<MDL	<MDL	3.4E+01	1.6E+02
5	13.4	INVALID	1.2E+02	2.3E+01	9.7E+00	<MDL	3.6E+01	4.3E+01	2.4E+02	1.4E+02
6	10.8	1.6E+01	1.4E+01	<MDL	<MDL	INVALID	<MDL	<MDL	3.2E+01	1.2E+01
7	13.1	INVALID	2.7E+01	INVALID	INVALID	INVALID	INVALID	INVALID	INVALID	INVALID
8	23.6	2.7E+01	2.6E+01	<MDL	<MDL	<MDL	INVALID	INVALID	INVALID	6.6E+00

Det = value was below the EQL of 15 ng/sample but $\geq$ MDL
MDL = 3.0 ng/sample
NA = Not Applicaple

C. Collocated Sample Results

Referring to Table 9, six valid collocated pairs of samples for the chlorothalonil application study had both results above the EQL. The relative percent differences (|C1-C2|/(C1+C2)/2*100) of the data pairs ranged from 1% to 49.5%.

Table 9 Chlorothalonil Collocated Results (ng/m^3)

Sampling Period	East	East Collocated	Average	Relative % Difference
1	1.5E+02	1.7E+02	1.6E+02	7.4
2	5.3E+02	3.2E+02	4.2E+02	49.5
3	6.0E+02	5.8E+02	5.9E+02	2.9
4	7.3E+02	7.4E+02	7.3E+02	1.0
5	INVALID	1.8E+02	NA	NA
6	2.3E+02	2.2E+02	2.2E+02	1.8
7	INVALID	1.1E+02	NA	NA
8	1.5E+02	1.4E+02	1.4E+02	9.2

Six valid collocated pairs of samples for the methamidophos application study had both results above the EQL. The relative percent differences of the data pairs ranged from 0.2% to 19.7% as shown in Table 10.

Table 10 Methamidophos Collocated Results (ng/m^3)

Sampling Period	East	East Collocated	Average	Relative % Difference
1	2.4E+02	1.9E+02	2.2E+02	19.7
2	7.8E+02	8.9E+02	8.3E+02	13.8
3	5.5E+02	5.2E+02	5.4E+02	6.4
4	3.5E+02	3.5E+02	3.5E+02	0.2
5	INVALID	1.2E+02	NA	NA
6	1.6E+01	1.4E+01	1.5E+01	14.0
7	INVALID	2.7E+01	NA	NA
8	2.7E+01	2.6E+01	2.7E+01	5.4

D. Laboratory, Trip and Field Spikes

Laboratory, trip and field spikes are all prepared at the same time and at the same concentration using cartridges from a single lot by Special Analysis Section staff. The spikes were prepared in replicate sets of four (4) to allow statistics to be applied if necessary to evaluate differences in the results of the three sets.

The laboratory spikes are placed immediately in a freezer and kept there until extraction and analysis. The trip spikes are kept in a freezer until transported to the field. The trip

spike samples are kept on dry ice in an ice chest (the same one used for samples) during transport to and from the field and at all times while in the field except for trip spike sample log-in and labeling.

The field spikes are kept in a freezer until transported to the field. The field spike samples are kept on dry ice in an ice chest (the same one used for samples) during transport to and from the field and at all times while in the field except for the sampling period. Field spikes were collected at the same environmental and experimental conditions as those occurring at the time of ambient sampling. The field spikes were obtained by sampling ambient air through the previously spiked cartridges and were collocated with background samples.

The extraction and analysis of laboratory, trip and field spikes normally occurs at the same time depending on when they arrive at the laboratory from the field. For this project, four chlorothalonil field spike samples, and one chlorothalonil trip spike sample were extracted and analyzed in the same batch. The remaining three chlorothalonil trip spike samples were analyzed with their associated field samples. Chlorothalonil laboratory spike samples were analyzed with each batch of field samples. A total of thirteen chlorothalonil laboratory spike samples were analyzed. The laboratory spike samples, field spike samples and trip spike samples for methamidophos were extracted and analyzed in a single batch. A summary of average spike recoveries is presented in Table 11.

Table 11 Average Spike Recoveries

	Average Recoveries	
Spike Type	**Chlorothalonil**	**Methamidophos**
Laboratory Spike	71%	106%
Trip Spike	48%	76%
Field Spike	74%	82%

1) Laboratory Spikes: The laboratory spike results for the chlorothalonil application study are listed in Table 12. Each of the spiked cartridges was injected with 420 ng of chlorothalonil. All spiked cartridges were prepared on the same day and in the same manner. The laboratory control sample analyzed with the spiked samples had 107% recovery. All spiked sample results were confirmed by reanalysis. The average recovery for chlorothalonil for the application lab spikes was 71%. Two lab spike samples, 3 and 4, had lower recoveries than the others. No anomalies were found in the review of the data or extraction and analytical procedures to explain the low recoveries.

   The laboratory spike results for the methamidophos application study are listed in Table 13. Each of the spike cartridges was injected with 750 ng of methamidophos. The average recovery for methamidophos for the application lab spikes was 106%.

Table 12 Chlorothalonil Lab Spike Results

Sample ID	Expected (ng/sample)	Actual (ng/sample)	Percent Recovery
Lab spike 1	4.2E+02	3.4E+02	81%
Lab spike 2	4.2E+02	3.5E+02	84%
Lab spike 3	4.2E+02	1.1E+02	27%
Lab spike 4	4.2E+02	1.4E+02	34%
Lab spike 5	4.2E+02	3.6E+02	87%
Lab spike 6	4.2E+02	2.4E+02	59%
Lab spike 7	4.2E+02	3.1E+02	74%
Lab spike 8	4.2E+02	3.5E+02	83%
Lab spike 9	4.2E+02	3.5E+02	85%
Lab spike 10	4.2E+02	3.6E+02	87%
Lab spike 11	4.2E+02	3.5E+02	84%
Lab spike 12	4.2E+02	2.3E+02	56%
Lab spike 13	4.2E+02	3.2E+02	78%
		Ave.=	**71%**

Table 13 Methamidophos Lab Spike Results

Sample ID	Expected (ng/sample)	Actual (ng/sample)	Percent Recovery
Lab spike 1	7.5E+02	7.9E+02	105%
Lab spike 2	7.5E+02	7.8E+02	104%
Lab spike 3	7.5E+02	8.2E+02	109%
Lab spike 4	7.5E+02	8.0E+02	107%
		Ave.=	**106%**

2) Trip Spikes: The trip spike results for the chlorothalonil application study are listed in Table 14. Each of the spiked cartridges was injected with 420 ng of chlorothalonil. The average recovery for chlorothalonil for the application trip spikes was 48%. A review of the spiking, extraction and analysis procedures was performed to determine possible reasons for low trip spike recoveries. No errors or miscalculations were found. As per the discussion in the laboratory report, possible sources of analyte loss during the extraction procedure are the spiking step and the sonication step. During spiking, liquid standards are injected onto the solid media in the cartridge. If the liquid standard was retained on the cartridge wall instead of wetting the media, spike recoveries may be low. The exact cause of the low spike recoveries is unknown.

Table 14 Chlorothalonil Trip Spike Results

Sample ID	Expected (ng/sample)	Actual (ng/sample)	Percent Recovery
ECB-TS	4.2E+02	1.8E+02	44%
SC-6-TS-1	4.2E+02	1.9E+02	46%
SC-6-TS-2	4.2E+02	1.9E+02	45%
SC-6-TS-3	4.2E+02	2.4E+02	57%
		Ave.=	**48%**

The trip spike results for the methamidophos application study are listed in Table 15. Each of the cartridges was spiked with 750 ng of methamidophos. The average recovery for methamidophos for the application trip spikes was 76%.

Table 15 Methamidophos Trip Spike Results

Sample ID	Expected (ng/sample)	Actual (ng/sample)	Percent Recovery
EMB-TS	7.5E+02	7.25E+02	97%
SM-6-TS-1	7.5E+02	5.59E+02	74%
SM-6-TS-2	7.5E+02	4.81E+02	64%
SM-6-TS-3	7.5E+02	5.04E+02	67%
		Ave.=	**76%**

3) Field Spikes: The field spike results for the chlorothalonil application study are listed in Table 16. Each of the cartridges was injected with 420 ng of chlorothalonil. The average recovery for chlorothalonil for the application field spikes was 74%.

Table 16 Chlorothalonil Field Spike Results

Sample ID	Expected (ng/sample)	Actual (ng/sample)	Collocated Amount	*Corrected Amount	Percent Recovery
SCB-FS	4.2E+02	3.95E+02	7.19E+01	3.2E+02	77%
WCB-FS	4.2E+02	4.02E+02	8.40E+01	3.2E+02	76%
NCB-FS	4.2E+02	3.73E+02	1.14E+02	2.6E+02	62%
ECB-FS	4.2E+02	4.20E+02	8.65E+01	3.3E+02	80%
				Ave.=	**74%**

*Corrected by subtracting the amount found in the corresponding collocated sample.

The field spike results for the methamidophos application study are listed in Table 17. Each of the cartridges was injected with 750 ng of methamidophos. The average recovery for methamidophos for the application field spikes was 82%.

Table 17 Methamidophos Field Spike Results

Sample ID	Expected (ng/sample)	Actual (ng/sample)	Collocated Amount	*Corrected Amount	Percent Recovery
EMB-FS	7.5E+02	6.4E+02	<MDL	NA	86%
NMB-FS	7.5E+02	6.1E+02	<MDL	NA	82%
SMB-FS	7.5E+02	5.8E+02	<MDL	NA	78%
WMB-FS	7.5E+02	6.3E+02	<MDL	NA	84%
				Ave.=	**82%**

NA = Not Applicable, correction not done when collocated concentration is less than MDL.

For methamidophos, the field spike results are consistent with the lab and trip spike results and indicate that the sampling, sample transport, storage and analytical procedures used in this study produce acceptable results for methamidophos. For chlorothalonil, the trip spike recoveries were low. However, the field and lab spike results were acceptable for chlorothalonil and indicate that the trip spike recoveries were anomalies that have no definitive explanation at this time.

VIII. Method Development

Refer to Appendix II, page 58, (Method Validation Results) for discussion and results of method development studies for chlorothalonil and methamidophos. The freezer storage stability study results show that chlorothalonil is stable for at least 24 days and methamidophos is stable for at least 21 days after sampling. All of the application samples for methamidophos were analyzed within 18 days. Most of the application samples for chlorothalonil were analyzed within 24 days. Those that were analyzed after 24 days from sampling are listed in Table 18.

Table 18 Chlorothalonil Analysis >24 Days

Sample ID	Date Sampled	Date Analyzed	# Days from Sampling to Analysis
SC-1	9/3/04	9/28/02	25
SWC-1	9/3/02	9/28/02	25
WC-1	9/3/02	9/28/02	25
NWC-1	9/3/02	9/28/02	25
NC-1	9/3/02	9/28/02	25
NEC-1	9/3/02	9/28/02	25
EC-1	9/3/02	9/28/02	25
EC-1C	9/3/02	9/28/02	25
SEC-1	9/3/02	9/28/02	25
SC-2	9/3/02	9/28/02	25
SWC-2	9/3/02	9/28/02	25
WC-2	9/3/02	9/28/02	25
NWC-2	9/3/02	9/28/02	25
NC-2	9/3/02	9/28/02	25
NEC-2	9/3/02	9/28/02	25
EC-2	9/3/02	9/28/02	25
EC-2C	9/3/02	9/28/02	25
SEC-2	9/3/02	9/28/02	25
SC-5	9/3/02	10/1/02	28
EC-8	9/5/02	10/1/02	26
EC-8C	9/5/02	10/1/02	26

Figure 1 Application Site Diagram

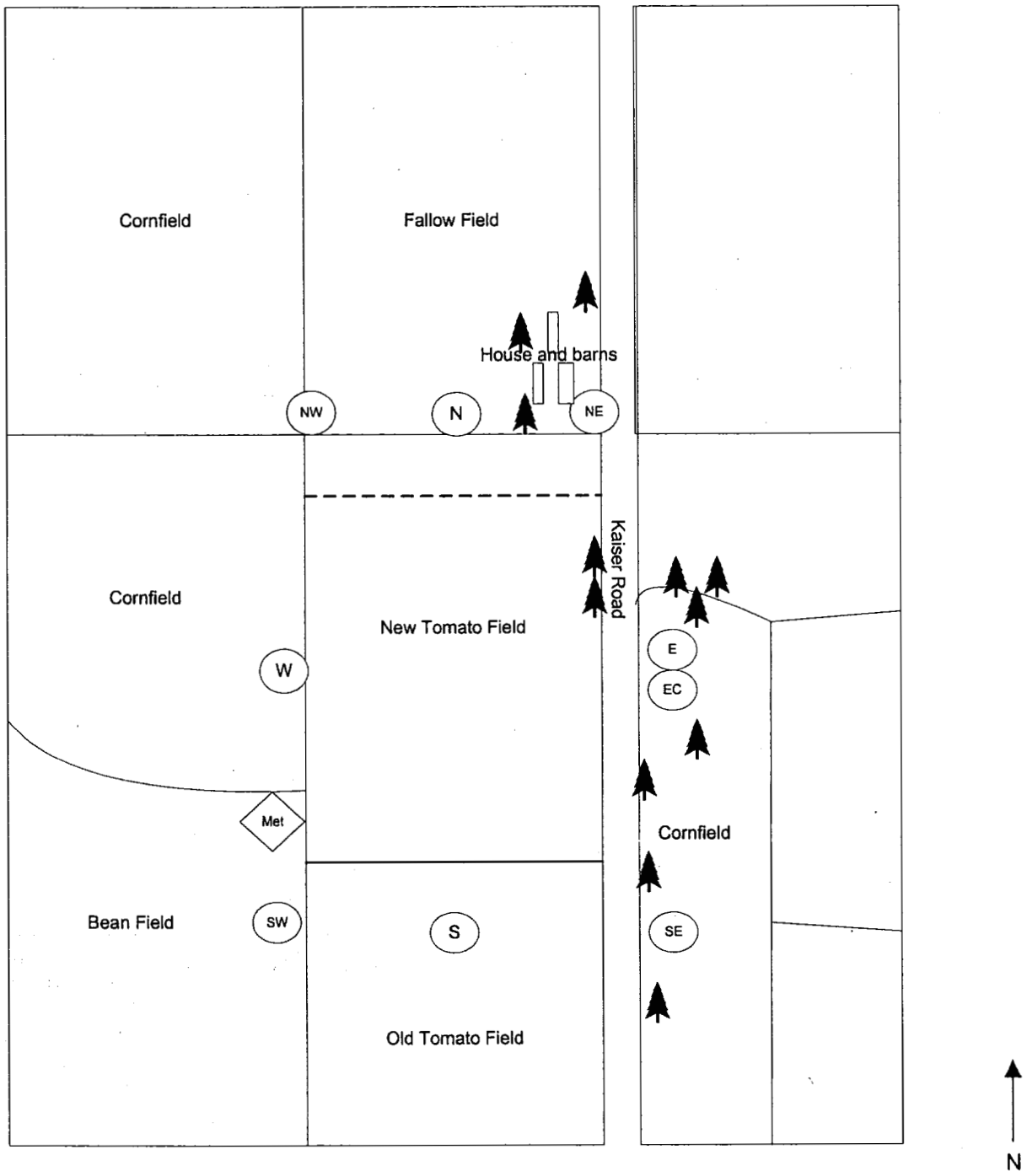


Figure 2 Application Sampler Placement Diagram

(not to scale)

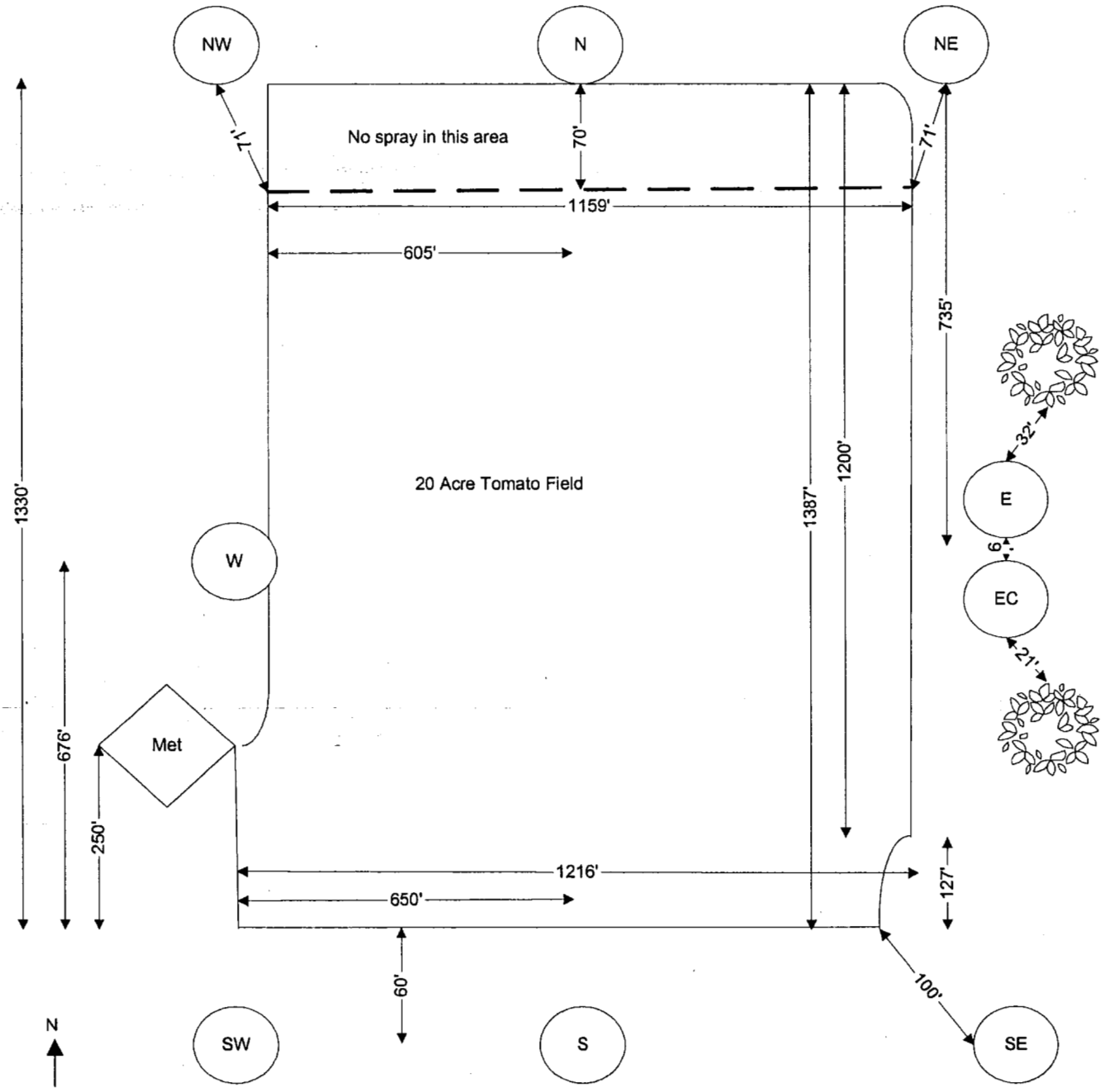
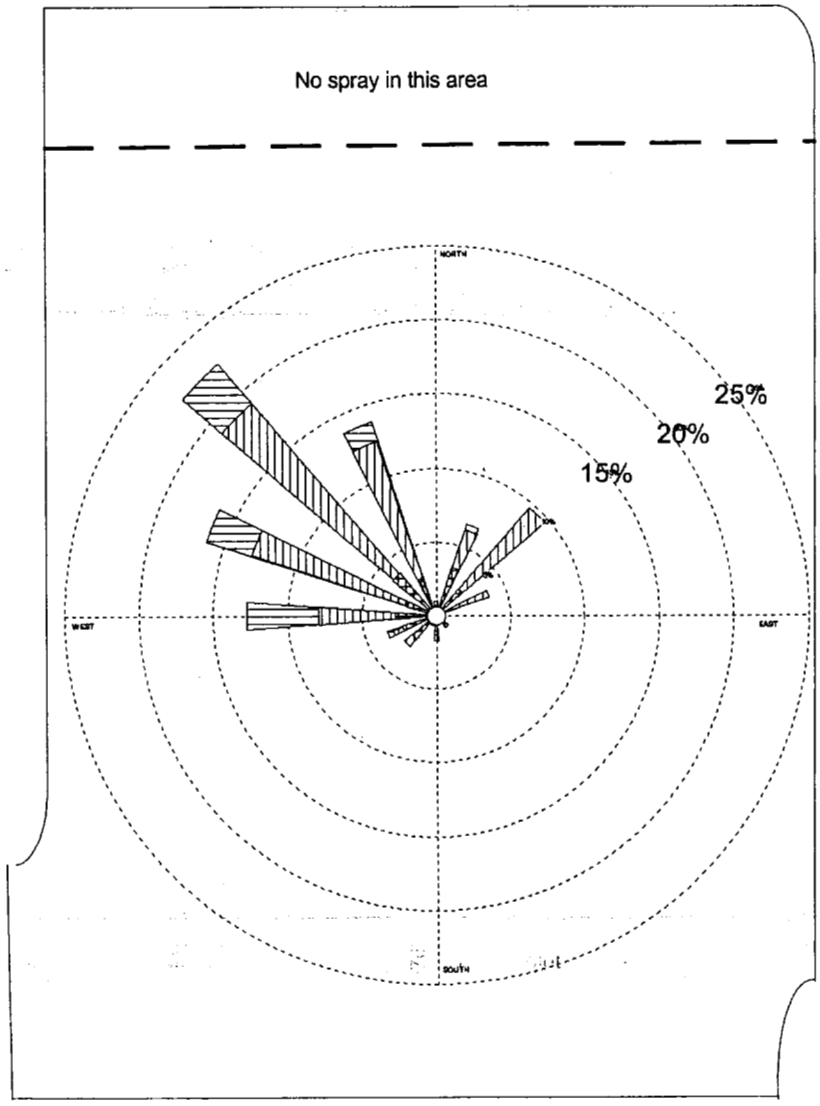


Figure 3

Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3) Background

North
M = <MDL
C = 27



West
M = <MDL
C = 20

East
M = <MDL
C = 21

South
M = <MDL
C = 17

M - Methamidophos C - Chlorothalonil

Orientation: Direction (blowing from)	**Ave. Wind Speed** 4.60 knots	**Calm Winds** 3.8%	**Sampling Date/Time** 9/02/02 0647 - 9/03/02 0659

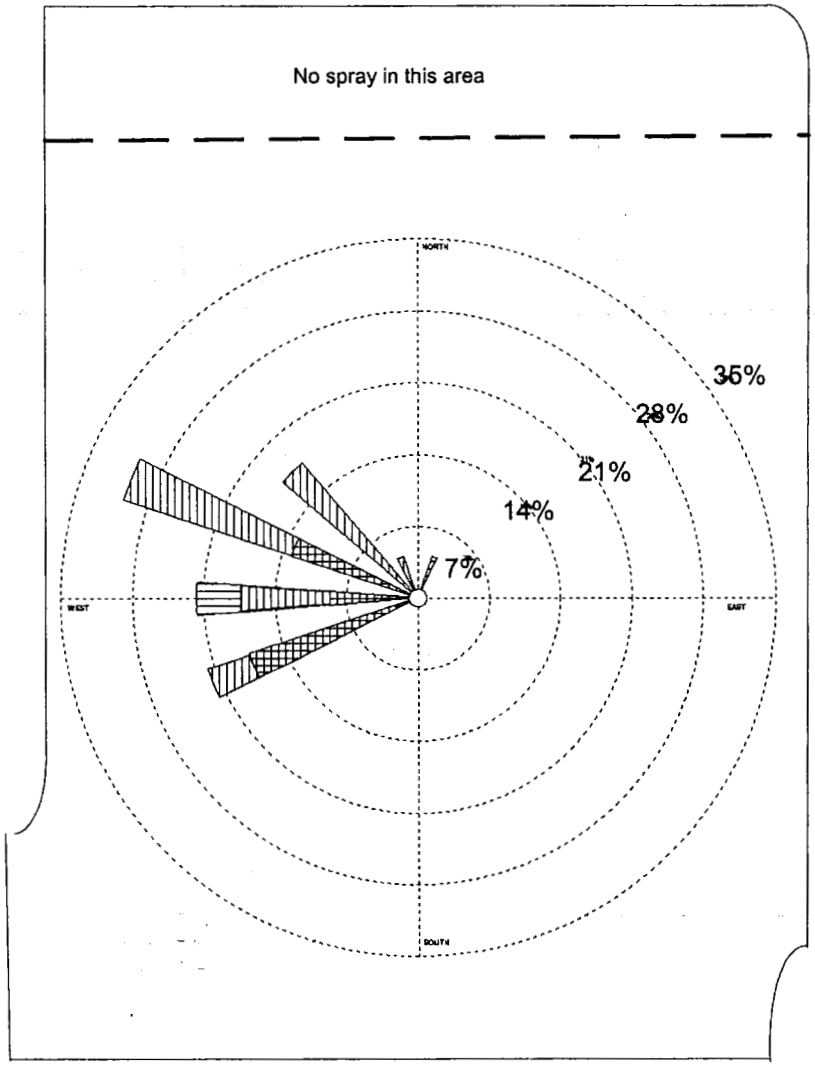
Figure 4

Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3)
Period 1

Northwest
M = <MDL
C = 23

North
M = Det
C = 29

Northeast
M = 42
C = 44



West
M = 490
C = 370

East
M = 240
C = 150

East Co
M = 190
C = 170

Southwest
M = <MDL
C = 11

South
M = 800
C = 300

Southeast
M = 410
C = 310

M - Methamidophos C - Chlorothalonil

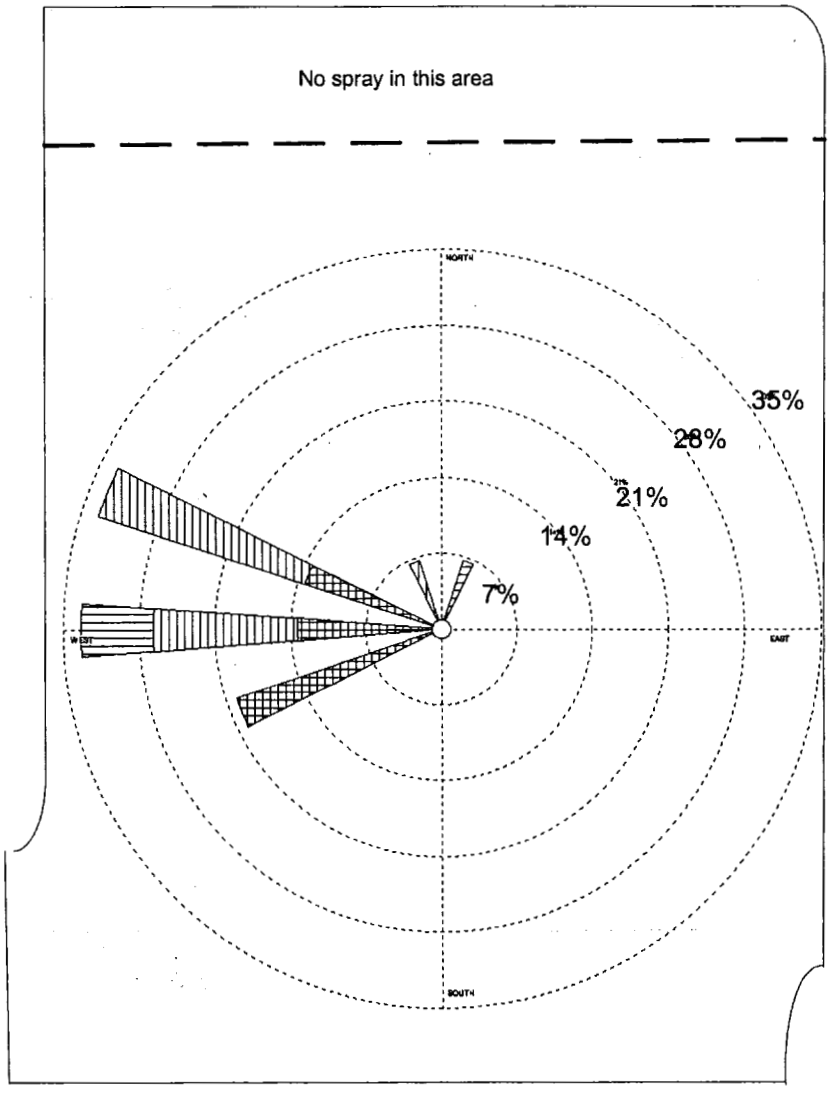
Orientation: Direction (blowing from)	**Ave. Wind Speed** 4.12 knots	**Calm Winds** 0%	**Sampling Date/Time** 9/03/02 0854 - 9/03/02 1220

Figure 5
Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3)
Period 2

Northwest
M = <MDL
C = 37

North
M = <MDL
C = 38

Northeast
M = <MDL
C = 43



West
M = 150
C = 290

East
M = 780
C = 530

East Co
M = 890
C = 320

Wind Speed (knots)
>21
17-21
11-16
7-10
4-6
1-3

Southwest
M = <MDL
C = 70

South
M = 160
C = 160

Southeast
M = 200
C = 420

M - Methamidophos C - Chlorothalonil

Orientation: Direction (blowing from)	**Ave. Wind Speed** 5.03 knots	**Calm Winds** 0%	**Sampling Date/Time** 9/03/02 1125 - 9/03/02 1330

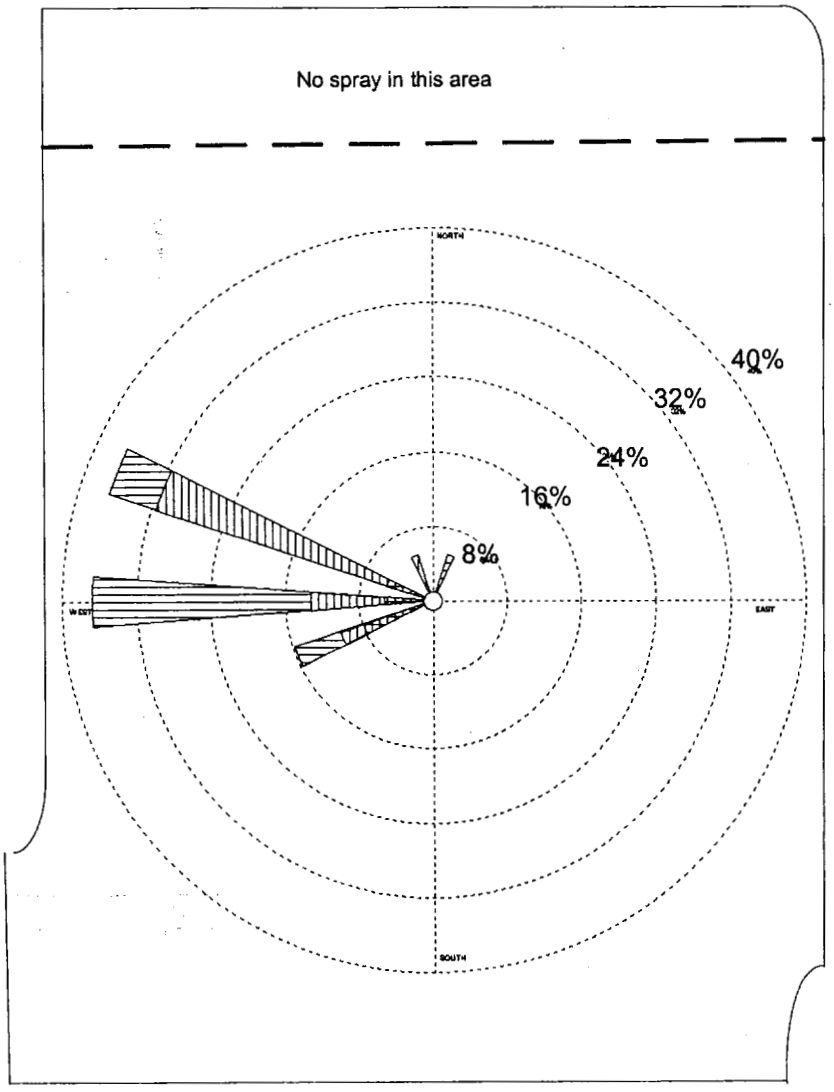
Figure 6

Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3)
Period 3

Northwest
M =<MDL
C = 9.8

North
M = Det
C = 69

Northeast
M = Det
C = 83

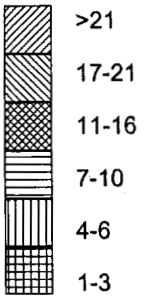


West
M = <MDL
C = 33

East
M = 550
C = 600

East Co
M = 520
C = 580

Wind Speed (knots)



Southwest
M = <MDL
C = 9.3

South
M = 100
C = 240

Southeast
M = 71
C = 290

M - Methamidophos C - Chlorothalonil

Orientation: Direction (blowing from)	Ave. Wind Speed 5.71 knots	Calm Winds 0%	Sampling Date/Time 9/03/02 1234 - 9/03/02 1530

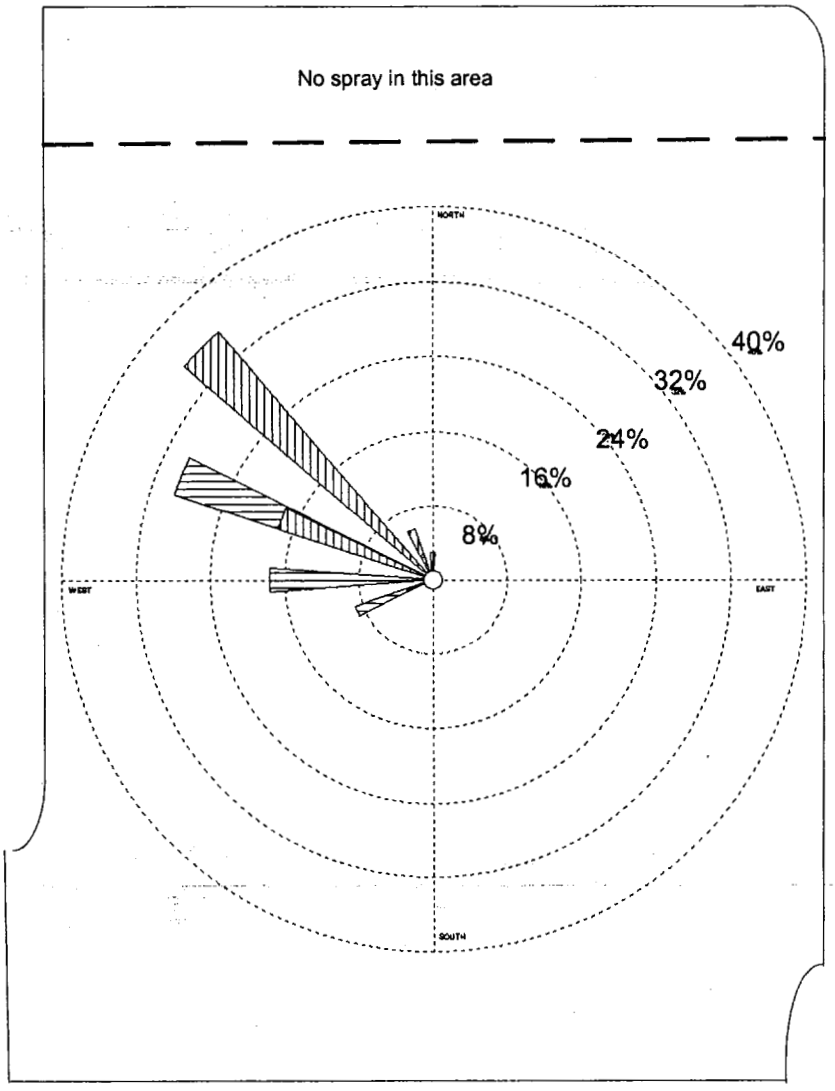
Figure 7

Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3) Period 4

Northwest
M = <MDL
C = 9.9

North
M = <MDL
C = 34

Northeast
M = <MDL
C = 58



West
M = <MDL
C = 49

East
M = 350
C = 730

East Co
M = 350
C = 740

Southwest
M = <MDL
C = 8.5

South
M = 34
C = 220

Southeast
M = 160
C = 390

M - Methamidophos C - Chlorothalonil

Orientation: Direction (blowing from)	**Ave. Wind Speed** 6.23 knots	**Calm Winds** 0%	**Sampling Date/Time** 9/03/02 1436 - 9/03/02 1824

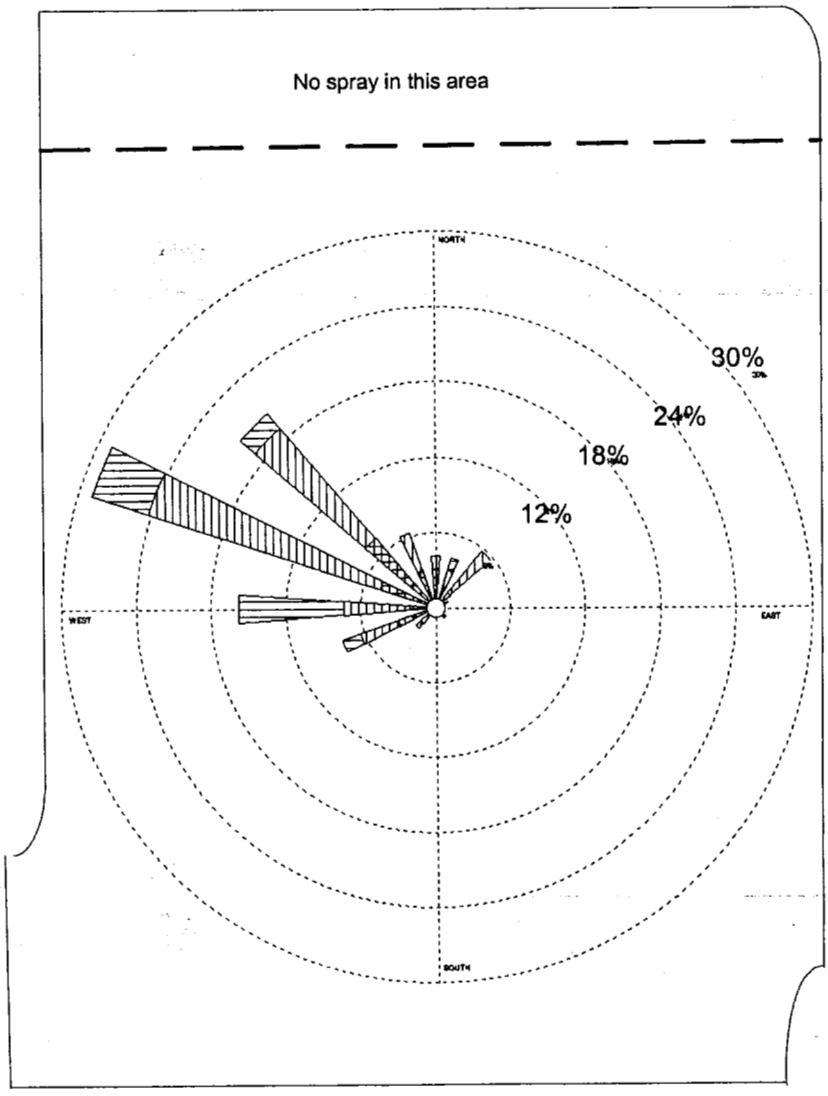
Figure 8

Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3)
Period 5

Northwest
M = <MDL
C = 29

North
M = 9.7
C = 49

Northeast
M = 23
C = 74



West
M = 36
C = 77

East
M =INVALID
C = INVALID

East Co
M = 120
C = 180

Southwest
M = 43
C = 80

South
M = 240
C = 130

Southeast
M = 140
C = 160

M - Methamidophos C - Chlorothalonil

Orientation: Direction (blowing from)	**Ave. Wind Speed** 4.67 knots	**Calm Winds** 1%	**Sampling Date/Time** 9/03/02 1725 - 9/04/02 0757

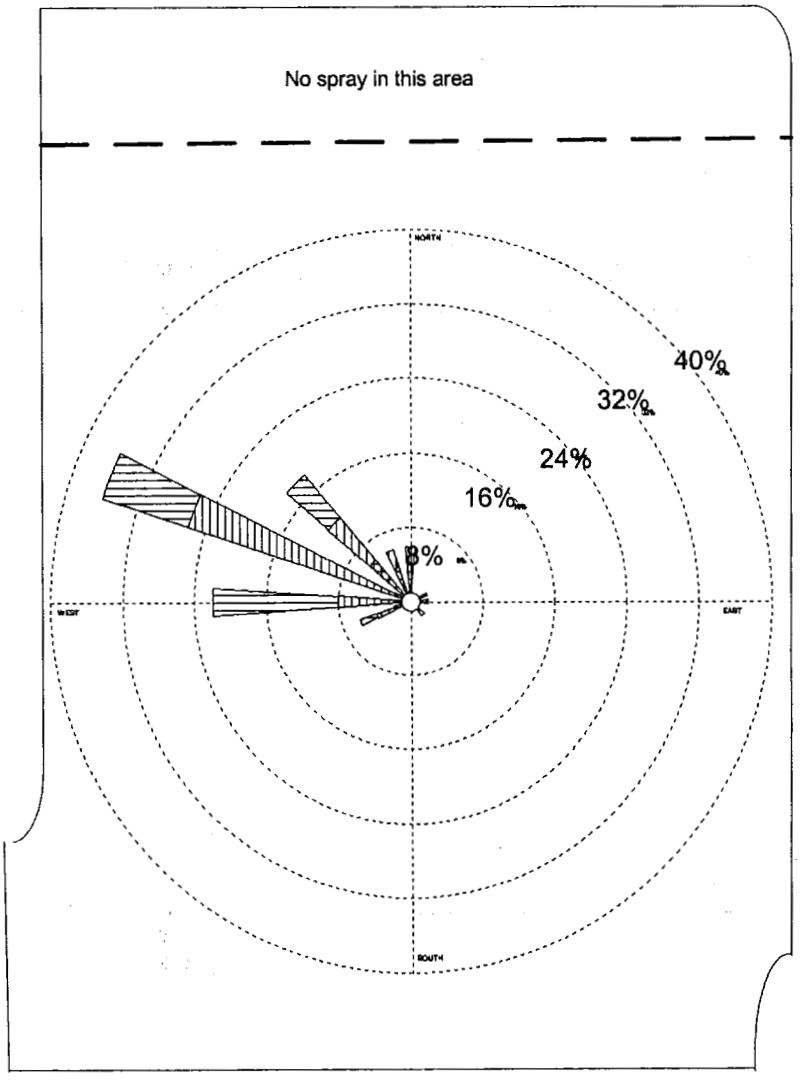
Figure 9

Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3) Period 6

Northwest
M = INVALID
C = INVALID

North
M = <MDL
C = 12

Northeast
M = <MDL
C = 19



West
M = <MDL
C = 46

East
M = 16
C = 230

East Co
M = 14
C = 220

Wind Speed (knots)
>21
17-21
11-16
7-10
4-6
1-3

Southwest
M = <MDL
C = 31

South
M = 32
C = 190

Southeast
M = 12
C = 190

M - Methamidophos C - Chlorothalonil

Orientation: Direction (blowing from)	**Ave. Wind Speed** 5.53 knots	**Calm Winds** 0%	**Sampling Date/Time** 9/04/02 0637 - 9/04/02 1843

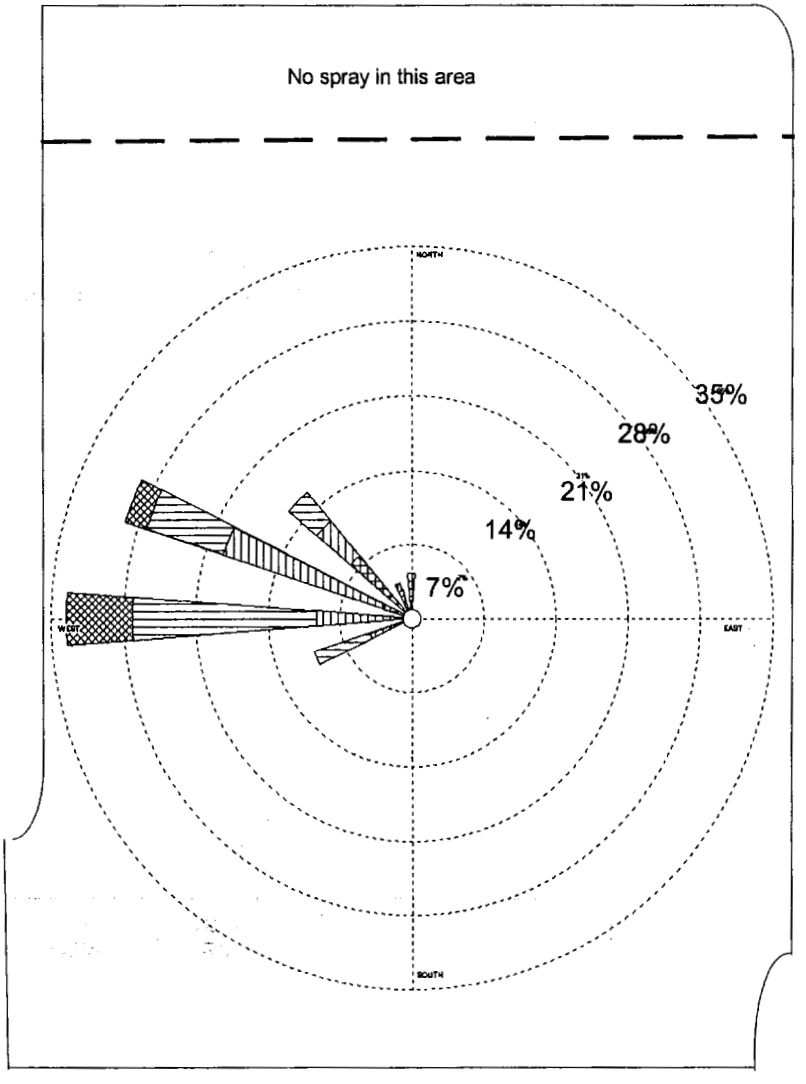
Figure 10

Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3)
Period 7

Northwest
M = INVALID
C = INVALID

North
M = INVALID
C = INVALID

Northeast
M = INVALID
C = INVALID

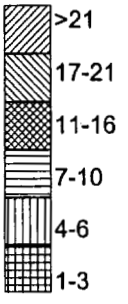


West
M = INVALID
C = INVALID

East
M = INVALID
C = INVALID

East Co
M = 27
C = 110

Wind Speed (knots)



Southwest
M = INVALID
C = INVALID

South
M = INVALID
C = INVALID

Southeast
M = INVALID
C = INVALID

M - Methamidophos C - Chlorothalonil

Orientation: Direction (blowing from)	**Ave. Wind Speed** 6.34 knots	**Calm Winds** 0%	**Sampling Date/Time** 9/04/02 1730 - 9/05/02 0750

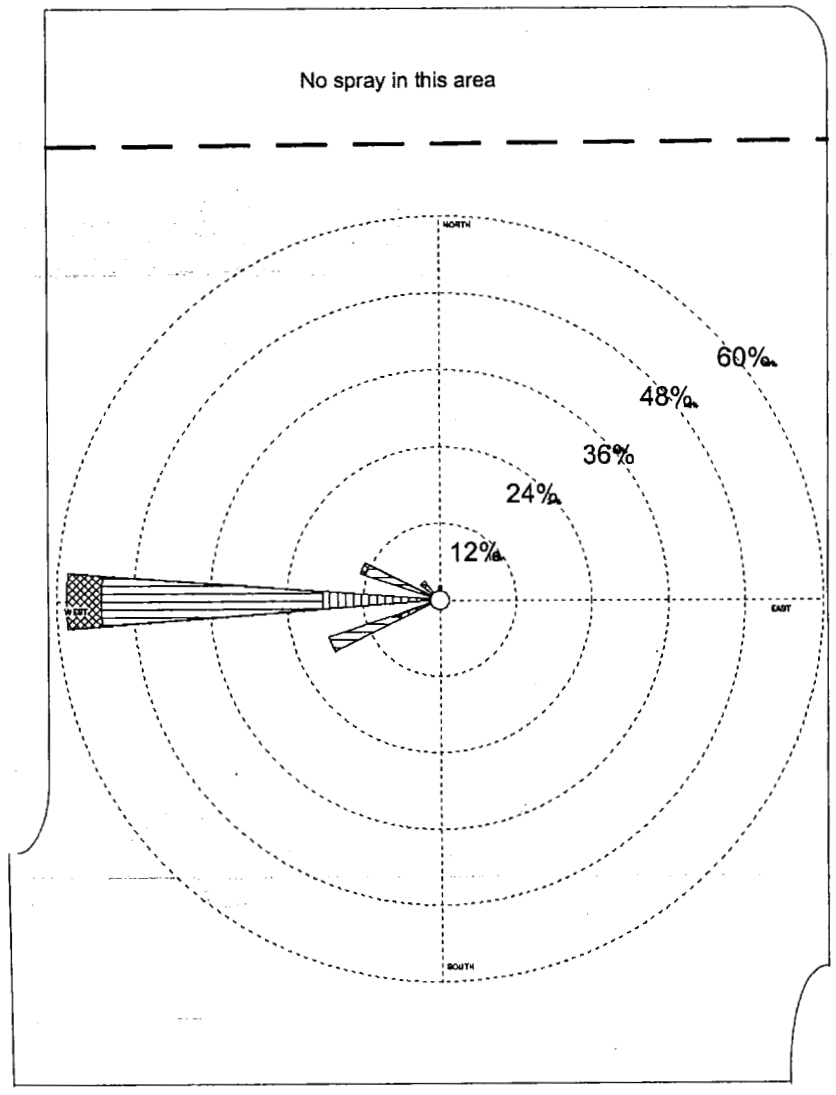
Figure 11

Air Monitoring Results for Chlorothalonil and Methamidophos (ng/m^3)
Period 8

Northwest
M = <MDL
C = 3.0

North
M = <MDL
C = 12

Northeast
M = <MDL
C = 16



West
M = INVALID
C = INVALID

East
M = 27
C = 75

East Co
M = 26
C = 69

Southwest
M = INVALID
C = INVALID

South
M = INVALID
C = INVALID

Southeast
M = 6.6
C = 71

M - Methamidophos C - Chlorothalonil

Orientation: Direction (blowing from)	**Ave. Wind Speed** 7.32 knots	**Calm Winds** 0%	**Sampling Date/Time** 9/05/02 0645 - 9/06/02 0720