

California Environmental Protection Agency



State of California
California Environmental Protection Agency
AIR RESOURCES BOARD

**Report for Air Monitoring
Around a Structural Application
of Sulfuryl Fluoride
Fall - 2002**

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

Project No. P-02-004

June 18, 2003

This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Monitoring Report Approval

Title: Report for the Air Monitoring Around a Structural Application of Sulfuryl Fluoride - Fall 2002

Prepared by: Kevin Mongar, Air Pollution Specialist

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

Signatures:



Jeffrey H. Cook, Chief
Quality Management Branch

6.27.03
Date



Kenneth R. Stroud, Chief
Air Quality Surveillance Branch

7/2/03
Date



Michael Poore, Chief
Northern Laboratory Branch

7/2/03
Date



William V. Loscutoff, Chief
Monitoring and Laboratory Division

7-2-03
Date

Executive Summary

Report for the Air Monitoring Around a Structural Application of Sulfuryl Fluoride – Fall 2002

This report presents the results of air monitoring for sulfuryl fluoride and chloropicrin around a structural fumigation. The monitoring was conducted at the request of the Department of Pesticide Regulation (DPR). The monitoring was conducted in Sacramento County, from October 28 to November 3, 2002, around a sulfuryl fluoride fumigation of a 1375 square foot house. The product label for sulfuryl fluoride (Vikane®) requires that chloropicrin be used as a warning agent (lacrymator) during the fumigation. The study was conducted around a fumigation for powderpost beetles, which requires an elevated level of fumigant relative to structural fumigation for other pests (e.g., termites).

Sulfuryl Fluoride

The sampling procedures used for sulfuryl fluoride for this study were not valid. The laboratory report states:

“With one exception, all samples with quantifiable results from the primary collection bed demonstrated quantifiable breakthrough into the secondary bed. Primary charcoal beds varied greatly in amount of sulfuryl fluoride collected. Staff consulted with SKC and NIOSH regarding sample breakthrough. NIOSH indicated that a sample collection rate of one liter (1 lpm) may be too high and that the collection rate should be kept at 0.1 lpm or less. They did not explain why method development tubes spiked with sulfuryl fluoride gas did not show breakthrough when subjected to 1 lpm sampling conditions for 24 hours. Because there was primary bed breakthrough, one might assume that sample may have been lost from breakthrough of the secondary collection beds.”

The laboratory report does not estimate the extent of the breakthrough. However, the fact that breakthrough onto the secondary bed occurred for all samples, even those of relatively short sampling duration (e.g., 2 hours), indicates that loss of sulfuryl fluoride was likely significant due to an ineffective sampling technique.

The sample results presented for sulfuryl fluoride in this report are not valid due to extensive breakthrough. Additional method development must be conducted to determine appropriate sampling strategies before further tests are conducted.

Chloropicrin

Concentrations of chloropicrin ranged from <MDL to 29,000 nanograms per cubic meter of sampled air (ng/m^3) (4300 parts per trillion by volume (pptv)). The highest concentration was observed at the 1S (see site diagram on page 13) sampling site during the mechanical vent sampling period (Period 5) of about 1.5 hours.

Of the 142 samples collected for chloropicrin (includes 4 background samples and 10 collocated samples), 65 sample results were found to have quantifiable concentrations above the EQL, 17 sample results were "detected," 58 sample results were <MDL, and 2 results were determined to be invalid due to sampling problems.

Four samples were collected for the background period (i.e., prior to application) from the northeast (2NE), northwest (2NW), southeast (2SE) and southwest (2SW) sites. The chloropicrin results from the 4 background samples were all <MDL.

At DPR's request, indoor monitoring was also conducted following aeration of the house. The results for the 24-hour samples collected in the bedroom on 11/2/02 and 11/3/02 were 1600 and 950 ng/m³, respectively. The results for the 24-hour samples collected in the living room on 11/2/02 and 11/3/02 were 2000 and 1400 ng/m³, respectively.

Acknowledgments

Assistance was provided by staff of the Sacramento County Agricultural Commissioner's Office. Staff of the Special Purpose Monitoring Section collected the samples. Jack Romans coordinated the field work. Jim Omand, Michael Orbanosky and Terry Houston of the ARB Special Analysis Section laboratory performed the method development and chemical analyses. Lynn Baker of the ARB Stationary Source Division provided comments on the monitoring protocol and report.

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION.....	1
II. SAMPLING	1
III. FUMIGATION MONITORING	2
IV. ANALYTICAL METHODOLOGY.....	6
V. APPLICATION MONITORING RESULTS	6
VI. FIELD QUALITY CONTROL.....	9
VII. QUALITY CONTROL RESULTS.....	10
A. TRIP BLANK	10
B. COLLOCATED SAMPLE RESULTS.....	10
C. LABORATORY, TRIP AND FIELD SPIKES	10

LIST OF FIGURES

1. MANIFOLD SAMPLER.....	12
2. FUMIGATION SITE DIAGRAM	13

LIST OF TABLES

1. FUMIGATION INFORMATION.....	2
2. FUMIGATION TEST SAMPLING PERIODS.....	5
3. RESULTS OF MECHANICAL VENT PERIOD DOUBLED SAMPLES.....	8
4. SPIKE RESULTS	11
5. SULFURYL FLUORIDE MONITORING RESULTS.....	14-20
6. CHLOROPICRIN MONITORING RESULTS	21-27

7.	SUMMARY OF CHLOROPICRIN RESULTS	28
8.	CHLOROPICRIN COLLOCATED SAMPLE RESULTS	29

APPENDICES

(contained in a separate volume)

I.	MONITORING PROTOCOL	1
II.	LABORATORY REPORT; SULFURYL FLUORIDE	42
III.	LABORATORY REPORT; CHLOROPICRIN	55
IV.	FUMIGATION LOG	68
V.	APPLICATION METEOROLOGICAL DATA	69
VI.	WIND ROSES	107
VII.	APPLICATION FIELD LOG SHEETS; SULFURYL FLUORIDE.....	118
VIII.	APPLICATION FIELD LOG SHEETS; CHLOROPICRIN	127

**Report for Air Monitoring
Around a Structural Application
of Sulfuryl fluoride
Fall - 2002**

I. Introduction

At the request of the California Department of Pesticide Regulation (DPR) (January 2, 2002 Memorandum, Helliker to Lloyd, and February 21, 2002 Memorandum, Sanders to Cook), the Air Resources Board (ARB) staff conducted monitoring in an attempt to determine airborne concentrations of pesticides sulfuryl fluoride and chloropicrin around a structural fumigation application. 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. The monitoring was conducted in Sacramento County, from October 28 to November 3, 2002, around a sulfuryl fluoride fumigation of a 1375 square foot house. The product label for sulfuryl fluoride (Vikane®) requires that chloropicrin be used as a warning agent (lacrymator) during the fumigation. The study was conducted around a fumigation for powderpost beetles, which requires an elevated level of fumigant relative to structural fumigation for other pests (e.g., termites).

The sampling and analysis followed the procedures outlined in 1) the monitoring protocol (page 1 of the separate volume of Appendices), 2) the quality assurance guidelines described in the "Quality Assurance Plan for Pesticide Air Monitoring" (May 11, 1999 version), 3) the "Standard Operating Procedure for the Determination of Sulfuryl Fluoride Measured as Fluoride by Ion Chromatography" (page 11 of the Appendices), and 4) the "Standard Operating Procedure, Sampling, and Analysis of Trichloronitromethane (Chloropicrin) in Application and Ambient Air using Gas Chromatography/Mass Selective Detector," (page 23 of Appendices).

II. Sampling

Air sampling for sulfuryl fluoride and chloropicrin was conducted with sampling tubes. For sulfuryl fluoride, the tubes were 8 mm x 110 mm, coconut shell charcoal with 400 mg in the primary section and 200 mg in the secondary (SKC catalogue #226-09). For chloropicrin, the tubes were 8 mm x 140 mm, XAD-4 with 400 mg in the primary section and 200 mg in the secondary (SKC special order).

Sample collection for sulfuryl fluoride was conducted at a flow rate of 1 standard liter per minute (sLpm). For chloropicrin, a flow rate of 90 standard cubic centimeters per minute (sccpm) was used.

The test protocol specified that two sulfuryl fluoride cartridges in series would be used for

sample collection during the "mechanical aeration" sampling period and only one sampling cartridge would be used for all other sampling periods. Doubling of the cartridges during the mechanical vent period was intended as a precaution to address possible breakthrough at higher concentrations. For this study the tubes were doubled at four sampling locations during the mechanical vent sampling period.

Each sample train consisted of an adsorbent tube, Teflon® fittings and tubing, rain/sun shield, needle valve, train support and a 12 volt DC vacuum pump (Figure 1). Tubes were prepared for use by breaking off the sealed glass end and immediately inserting the tube into the Teflon® fitting. The tubes were oriented in the sample train according to a small arrow printed on the side indicating the direction of flow. A needle valve with a range of 0.5-4 Lpm was used to control sample flow for the sulfuryl fluoride sampling and a needle valve with a range of 25-500 ccpm was used to control the flow for the chloropicrin sampling. The flow rates were set using calibrated digital mass flow meters (MFM) before the start of each sampling period. A MFM scaled from 0-5 sLpm was used for sulfuryl fluoride and a 0-100 sccpm MFM was used for the chloropicrin samplers. 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 Appendix I (page 29 of Appendices).

Immediately after sampling, the tubes were capped, labeled, placed in a culture tube and stored and transported in an insulated container with dry ice to the ARB laboratory in Sacramento.

Caution was used during field monitoring, transportation, storage, and lab analysis to minimize exposure of samples to sunlight in order to prevent photo degradation of chloropicrin.

III. Fumigation Monitoring

A vacant single-family house in Sacramento was chosen for the fumigation monitoring site. Refer to Figure 2 for a diagram of the site. Refer to Appendix IV (page 68 of Appendices) for a copy of the fumigation log. Table 1 summarizes the application information.

Table 1
Fumigation Information

Location:	2624 57 th Avenue, Sacramento CA
Type of Structure:	Single Story House
Size of Structure:	1375 square feet
Product Applied:	Vikane®, chloropicrin
Type of Application:	Structural
Pest controlled:	Powderpost Beetle

Application Rate: 70.8 lbs. Vikane® total; 51.5 oz/1000 cubic feet
(at "10x ounce hours")
1.5 oz chloropicrin total
Applicator: The Ultratech Division/ Bart Fergesun
Duration of Fumigation: 48 hours
(Amount of Vikane® was calculated assuming 36-hour duration)
Duration of Vent 45 minutes (including tarp removal)
Duration of Aeration: 22 hours

Application Dosage

The DPR's monitoring recommendation (February 21, 2002 memo, Sanders to Cook, Updated Monitoring Recommendations for 2001) directed that:

"The application dosage of sulfuryl fluoride can vary, for a typical single-family house fumigation, from 6 – 16 ounces per 1,000 cubic feet for termites to 10 times of this application rate necessary to control Powderpost beetle. DPR recommends selecting a site that will be treated for the Powderpost beetle to assure a higher application rate, i.e., 60 – 160 ounces per 1,000 cubic feet."

From the applicator, ARB staff learned that the application rate for powderpost beetle is actually 10 times (10x) higher in ounce hours (time weighted exposure), not total amount (or concentration) of Vikane®. The range of fumigation rates for powderpost beetles at '10x' the ounce hours would be approximately 18 to 64 ounces per 1000 cubic feet using the Industry standard procedures. As per Table 1, 51.5 ounces per 1000 cubic feet were used to fumigate the structure during this study.

As per the applicator and the 'Fumiguide' (portable, handheld device used to calculate application rates) the ounces of Vikane® per 1000 cubic feet used for powderpost beetle is about 3 to 4 times that used for termites, assuming a 36 to 48 hour exposure rather than the typical exposure period for termites of from 16 to 18 hours.

Application Site Selection/Sampler Positions

The DPR's monitoring recommendation directed that:

"The structure selected for monitoring must have enough clearance surrounding it to allow for sampler placement at a distance of 5 and 10 feet from the edge of the structure. Four background samples should be taken prior to application. Twelve samplers should be placed surrounding the structure as 3 rings. The first ring consists of four samplers located at the middle of and 5 feet from each side of the structure. The second ring consists of four samplers 10 feet out from each corner of the structure. The third ring contains four samplers which would be placed 30 to 80 feet from each side or corner of the structure. A thirteenth sampler will be collocated with one sampler in the first ring and at the site expected to be downwind during aeration. The collocated sample will be collected at this site during each sampling interval. Sample intake should be 1.5 to 2.0 meters above the ground."

In addition to the samplers listed above, two more samplers were used during the "mechanical aeration" (period 5) and first aeration (period 6) sampling periods and were placed downwind of the structure at a distance of approximately 60 feet. The collocated sampler was positioned at the east-side of the house. Two more samplers were placed inside the structure for collection of post-aeration samples. Background samples were collected at the four corner (2nd ring) locations for 24 hours prior to the fumigation.

All samplers were positioned at the same elevation relative to the house. All sampler inlets were approximately five to six feet above the ground.

Sampling Periods

The fumigation process for powderpost beetles was expected to consist of a 36 to 72 hour exposure period, followed by a one to four hour mechanical vent period and an eight to forty-eight hour aeration period. The DPR's monitoring recommendation also directed that:

"For both sulfuryl fluoride and chloropicrin, samples should be taken before application, during application (exposure period), during mechanical and tarp removal aeration (alternate Daytime/Overnight sampling according to the duration of aeration), and post aeration for two Daytime/Overnight sampling periods. Additionally, after completion of aeration, two 24-hour samples should be taken at each of two different locations inside the fumigated structure for 48-hours sampling duration (total of four samples inside structure)."

Exposure Period: The fumigation process for powderpost beetles was expected to consist of a 36 to 72 hour exposure period and the intention of this study was to target a fumigation using a shorter exposure period (i.e., 36 hours rather than 72 hours) as higher Vikane® application rates are required to meet the 10x fumigation ounce hours. The Vikane® application rate for this study was calculated using an assumption of a 36-hour exposure. However, the actual exposure period was approximately 48 hours.

Mechanical Vent Period: The "mechanical vent" period is a short aeration conducted at the end of the exposure period just prior to removal of the tarps. The purpose of the mechanical venting is to remove the gas between the tarp and the structure to minimize occupational exposure during removal of the tarps. A fan is used to blow the gas between the tarp and the structure out a small vent pipe usually located at the height of the roof overhang. For this study, the mechanical vent sampling period included the time during removal of the tarp covering the structure. The time required for mechanical venting and tarp removal was approximately 45 minutes. However, due to the length of time required for sample change-out, this sampling period actually lasted for approximately 1.5 hours during this study. Referring to Figure 2, the mechanical vent was located at the roof overhang on the east side of the house.

Aeration Period: For the purpose of this study, aeration was defined as starting when the tarps were completely removed. The aeration period required by the product label is a

minimum of eight hours. However, fumigation companies may choose to aerate the structure for a longer period of time, e.g., up to 48 hours. In any case, a fumigated structure cannot be reentered until it is "cleared" as having Vikane® concentrations of less than five parts per million by volume (ppmv). The fumigator uses a Miran or Interscan gas analyzer to measure the Vikane® concentration to clear the structure for reentry.

Higher concentrations of sulfuryl fluoride would be expected to remain in the interior of the structure at the end of a shorter aeration period. The intention of this study was to target a fumigation using the label required minimum eight hour aeration period (i.e., re-entry would be cleared and post aeration sampling would begin after eight hours of aeration) in order to determine air concentrations within the structure after the minimum label required aeration. However, this was not accomplished. The aeration period for this study lasted approximately 22 hours.

The sampling schedule listed in the monitoring protocol (Appendix I) was provided as a guide. Table 2 lists the actual fumigation test sampling periods. The sample times listed are approximate. Refer to the field log sheets for the exact start and stop times for each sample.

Table 2
Fumigation Test Sampling Periods

<u>Period</u>	<u>Approx. # Hours</u>	<u>Date</u>	<u>Time</u>
Background	23 hours	10/28-29/02	1100 to 1000
1 (exposure/daytime)	4.75 hours	10/29/02	1125 to 1610
2 (exposure/overnight)	15.5 hours	10/29-30/02	1610 to 0740
3 (exposure/daytime)	8.5 hours	10/30/02	0740 to 1610
4 (exposure/overnight)	15.5 hours	10/30-31/02	1610 to 0735
5 (mechanical vent)	1.5 hours	10/31/02	0850 to 1025
6 (aeration/daytime)	5.5 hours	10/31/02	1025 to 1600
7 (aeration/overnight)	15.75 hours	10/31-11/1/02	1600 to 0745
8 (post/daytime)	8.25 hours	11/1/02	0745 to 1600
9 (post/overnight)	15.75 hours	11/1-2/02	1600 to 0750
10 (post/daytime)	8.25 hours	11/2/02	0750 to 1600
Inside 1	24 hours	11/1-2/02	0900 to 0900
Inside 2	24 hours	11/2-3/02	0900 to 0900

The house was fumigated at 1130 on 10/29/02. Mechanical venting started at 0905 and ended at 0920 on 10/31/02. Tarp removal started at 0925 and was finished at 0950 on 10/31/02. Due to the length of time required for sample change-out the actual sampling period was longer than the mechanical vent period. Aeration lasted for approximately 22 hours, beginning at 0950 on 10/31/02 and the house was cleared for re-entry at 0800 on 11/1/02.

Meteorological Monitoring

The meteorological station (oriented toward true north) was positioned 45 feet to the west and 17 feet to the south of the southwest corner of the house. The meteorological station was set up, at a height of 21 feet, to determine wind speed and direction, air temperature, barometric pressure and relative humidity. The raw meteorological station data are available on a 1.44 MB diskette in comma delimited text format. Appendix V (page 69 of the Appendices) lists the meteorological station data in 5-minute averages for the test period. ARB staff noted the degree of cloud cover on the sample log sheet whenever sample cartridges were changed. The conditions were clear during the study period.

IV. Analytical Methodology

The sampling and analysis method (SOP) and validation results for sulfuryl fluoride are included in Appendix I. The sulfuryl fluoride method consists of sampling with charcoal cartridges at a flow rate of one sLpm followed by extraction with 40 millimolar sodium hydroxide and anion exchange ion chromatography. The DPR recommended a target 24-hour estimated quantitation limit (EQL) of 30 ug/m³ for sulfuryl fluoride. The SOP specifies an EQL of 2.4 ug/m³ for a 24-hour sample collected at one sLpm.

The SOP for chloropicrin is included in Appendix I. The chloropicrin method consists of sampling with XAD-4 cartridges, extraction with three milliliters of methylene chloride and analysis using gas chromatography/mass selective detector operated in the selected ion-monitoring mode. The DPR recommended a target 24-hour EQL of 0.1 ug/m³ for chloropicrin. The SOP specifies an EQL of 19.8 ng/sample, which corresponds to 153 ng/m³ (0.153 ug/m³) for chloropicrin for a 24-hour sample collected at 90 sccpm.

V. Monitoring Results

The monitoring study included one background sampling period at four positions outside the house, ten fumigation/post-fumigation sampling periods at 12 positions (1 collocated) outside the house and two sampling periods (post-aeration) at the two positions inside the house. Samples were also collected at two additional positions outside the house for the mechanical vent (period 5) first aeration (period 6) sampling periods. A total of 142 samples each were collected for sulfuryl fluoride and chloropicrin. One sulfuryl fluoride sample (log # 104) and 2 chloropicrin samples (log #s 104 and 142) were not valid due to a low flow rate measured at the end of the sampling period.

Tables 5 and 6 of this report present the results of air monitoring for sulfuryl fluoride and chloropicrin in units of ug/m³ and ng/m³, respectively, and in units of parts per billion by volume (ppbv) and parts per trillion by volume (pptv), respectively. A summary of the chloropicrin results is presented in Table 7.

The equation used to convert sulfuryl fluoride air concentration results from units of ug/m³ to units of ppbv at one atmosphere and 25 °C is shown below.

$$\text{ppbv} = (\text{ug}/\text{m}^3) \times \frac{(0.0820575 \text{ liter-atm}/\text{mole}\cdot\text{K})(298\text{K})}{(1 \text{ atm})(102.1 \text{ gram}/\text{mole})} = (0.2395) \times (\text{ug}/\text{m}^3)$$

The equation used to convert chloropicrin air concentration results from units of ng/m³ to units of pptv at 1 atmosphere and 25 °C is shown below.

$$\text{pptv} = (\text{ng}/\text{m}^3) \times \frac{(0.0820575 \text{ liter-atm}/\text{mole}\cdot\text{K})(298\text{K})}{(1 \text{ atm})(164.4 \text{ gram}/\text{mole})} = (0.1487) \times (\text{ng}/\text{m}^3)$$

Sulfuryl Fluoride

Referring to Table 1 of Appendix II (page 48 of appendices), the primary and secondary beds of the sample cartridges were analyzed and reported separately. The total amount per cartridge was also reported which was used to generate the air concentration results listed in Table 5. The lab report states:

"With one exception, all samples with quantifiable results from the primary collection bed demonstrated quantifiable breakthrough into the secondary bed. Primary charcoal beds varied greatly in amount of sulfuryl fluoride collected. Staff consulted with SKC and NIOSH regarding sample breakthrough. NIOSH indicated that a sample collection rate of one liter (1lpm) may be too high and that the collection rate should be kept at 0.1 lpm or less. They did not explain why method development tubes spiked with sulfuryl fluoride gas did not show breakthrough when subjected to 1 lpm sampling conditions for 24 hours. Because there was primary bed breakthrough, one might assume that sample may have been lost from breakthrough of the secondary collection beds."

The lab report does not estimate the extent of the breakthrough. However the fact that breakthrough onto the secondary bed occurred for all samples, even those of relatively short sampling duration (e.g., 2 hours), indicates that loss of sulfuryl fluoride was significant due to an ineffective sampling technique. In addition, referring to Table 3 below, four samples were collected using double cartridges during the mechanical vent period (log numbers 72, 72A, 73, 73A, 79, 79A, 80, 80A, where 'A' designates the back cartridge). In all four cases sulfuryl fluoride was found in both the primary and secondary sections of the front and back cartridge. In all four cases, the total amounts (1° + 2°) found in the back cartridges were approximately the same as the amounts found in the corresponding front cartridges. In all eight cartridges, the amount found in the secondary section was approximately half that found in the primary section (i.e., the ratio was consistent even for the back cartridges).

Dual Charcoal Cartridge (glass tube) Configuration

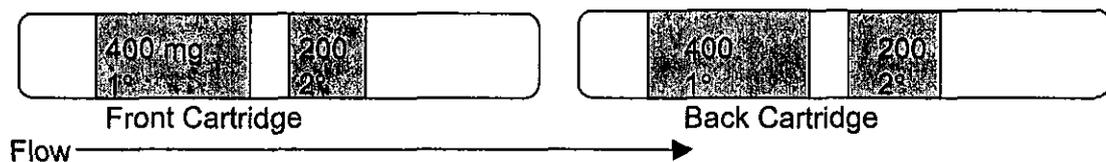


Table 3 Results of Mechanical Vent Period Doubled Samples (ug/sample).

Sample Log #	Primary bed	Secondary bed	Total	Secondary/Primary
72	113	59	172	0.53
72A (back)	104	55	160	0.53
73	70	41	111	0.59
73A (back)	73	40	113	0.56
79	22	12	40	0.56
79A (back)	26	14	34	0.53
80	30	17	47	0.56
80A (back)	30	15	45	0.50

These results indicate that there was breakthrough even through the back cartridge in the double cartridge samples. The amount of charcoal in each cartridge in the secondary section (200 mg) is half that in the primary section (400 mg). As noted previously, the amount of sulfuryl fluoride in each cartridge found in the secondary section is approximately half (0.50 to 0.59) that in the primary, regardless of the total amount in the cartridge. Thus, in each case, the sulfuryl fluoride was evenly distributed in the charcoal in the doubled cartridges. This may indicate little or no retention of sulfuryl fluoride under these sampling conditions or that equilibrium sampling conditions (outlet concentration equals inlet concentration) were reached. In either case breakthrough of sulfuryl fluoride is indicated.

Note that the sample duration for the above samples was approximately two hours with sample volumes of approximately 0.12 m³ at the sampling rate of 1 sLpm used for this study. The lower sampling flow rate of 0.1 sLpm suggested in the lab report would collect a volume of 0.144 m³ for a 24-hour sample. Thus, breakthrough may still be an issue even at the lower flow rate. Note that, as per the SKC catalog, NIOSH method 6012 recommends a sample flow rate of 20 ccpm for an 8-hour sample (0.0096 m³ sample volume) using SKC sampling cartridge 226-09 (the same as used for this study; 200/400 mg coconut shell charcoal) and the OSHA CSI method recommends a sample flow rate of 100 ccpm for a 4-hour sample (0.024 m³ sample volume) using SKC sampling cartridge 226-16 (200/800 mg coconut shell charcoal). Referring to Section VII, Part C, of this report it is unclear at this time why the breakthrough was not also observed in the method development and field spike quality control samples.

The results presented for sulfuryl fluoride in this report should not be considered as valid sample results due to the unknown extent of breakthrough.

No sample results have been adjusted or corrected for recoveries of quality assurance spike samples. Results for sample log numbers 1 through 13 (background samples, field

spikes, trip spikes and trip blank) were corrected in the laboratory report by subtraction of an average method blank result.

Chloropicrin

Of the 142 samples collected for chloropicrin (includes 4 background samples and 10 collocated samples), 65 sample results were found to have quantifiable concentrations above the EQL, 17 sample results were "detected", 58 sample results were <MDL, and 2 results were determined to be invalid due to sampling problems.

Four samples were collected for the background period (i.e., prior to application) from the northeast (2NE), northwest (2NW), southeast (2SE) and southwest (2SW) sites. The chloropicrin results from the 4 background samples were all <MDL.

The highest concentration, 29,000 ng/m³ (4300 pptv) was observed at the 1S sampling site during the mechanical vent sampling period (Period 5) of about 1.5 hours.

The results for the 24-hour samples collected in the bedroom on 11/2/02 and 11/3/02 were 1600 and 950 ng/m³, respectively. The results for the 24-hour samples collected in the living room on 11/2/02 and 11/3/02 were 2000 and 1400 ng/m³, respectively.

VI. Field Quality Control

Field quality assurance for the application monitoring included the following:

- 1) Four field spikes 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).
- 2) Four trip spikes 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.
- 3) Four lab spikes 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.
- 4) Collocated (replicate) samples taken for all sampling periods (except the background period) at one sampling location (E).
- 5) A trip blank obtained, labeled, recorded on the field log-sheet, and transported and submitted along with the field spikes and application samples.
- 6) The battery operated mass flow meters used to set and check the sampling flow rate were calibrated by the ARB's Program Evaluation and Standards Section.

- 7) A flow audit of each sampler was performed by the Quality Assurance Section (QAS) on August 30, 2002, at the MLD's 5th Street warehouse facility. All pesticide sampler flow rates were within the QAS's $\pm 10\%$ control limit.

VII. Quality Control Results

A. Trip Blanks

The result for the sulfuryl fluoride trip blank was <MDL. The trip blank result was corrected in the laboratory report by subtraction of an average method blank result of 6.1 ug/sample. The uncorrected trip blank result was not provided.

The result for the chloropicrin trip blank was <MDL.

B. Collocated Sample Results

The relative percent difference (RPD) of the collocated results provides an indication of the precision of the monitoring method (i.e., the lower the RPD the better the precision). RPD is calculated as follows: $RPD = (| \text{difference} | / \text{average}) \times 100$.

Referring to Table 8, 6 collocated pairs of samples for the fumigation study had both chloropicrin results above the EQL. The RPD of the data pairs ranged from 9% to 63%, with an average of 23%, indicating acceptable precision for the sampling and analyses.

C. Laboratory, Trip and Field Spikes

The purpose of collecting spiked samples is to assess the accuracy (% recovery) of the sampling and analytical methods. The field spikes are collected by sampling ambient air through the previously spiked cartridges at one of the sampling sites during the background sampling. Thus, the field spikes provide an assessment of the accuracy of the entire method and are collected under the same environmental and experimental conditions as those occurring at the time of ambient sampling. The lab and trip spikes are used to confirm the field spike results or to help identify the source of losses (or other problems) when they occur in the field spikes.

Laboratory, trip, and field spikes were prepared by spiking a known amount of the target compound onto the appropriate cartridges. The spikes were made and collected in sets of four.

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

labeling. The extraction and analysis of each set of laboratory, trip and field spikes normally occurs at the same time. The collocated (unspiked) background sample result, if above the EQL, was subtracted from the field spike sample result before calculation of percent recovery of the analytes.

The lab, trip and field spike results (average % recovery) are summarized in Table 4 and discussed below.

Table 4, Spike Results

	Sulfuryl Fluoride	Chloropicrin
Lab	101%	91%
Trip	96%	85%
Field	94%	83%

Sulfuryl Fluoride: The sulfuryl fluoride laboratory, trip and field spike results for the fumigation study are listed in Table 2 of Appendix II (page 54 of appendices). Each of the spike cartridges was spiked with 55.2 ug/sample of sulfuryl fluoride. The reported results are the results for the front portion of the cartridges only. Concentrations found in the secondary portion of the cartridges were all below the EQL.

The sulfuryl fluoride field spike results do not agree with the indication that there is breakthrough of sulfuryl fluoride occurring in the ambient samples, as discussed in Section V. In this case the field spike results apparently are not reflective of actual sampling efficiency for sulfuryl fluoride. As stated in the lab report, NIOSH and SKC did not explain why method development tubes spiked with sulfuryl fluoride gas did not show breakthrough when subjected to 1 lpm sampling conditions for 24 hours. There currently is no explanation for this discrepancy.

Chloropicrin: The chloropicrin laboratory, trip, and field spike results for the fumigation study are listed in Table 2 of Appendix III (page 67 of appendices). Each of the spike cartridges was spiked with 225 ng/sample of chloropicrin. 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 chloropicrin.

Figure 1 Cartridge Sampling Manifolds

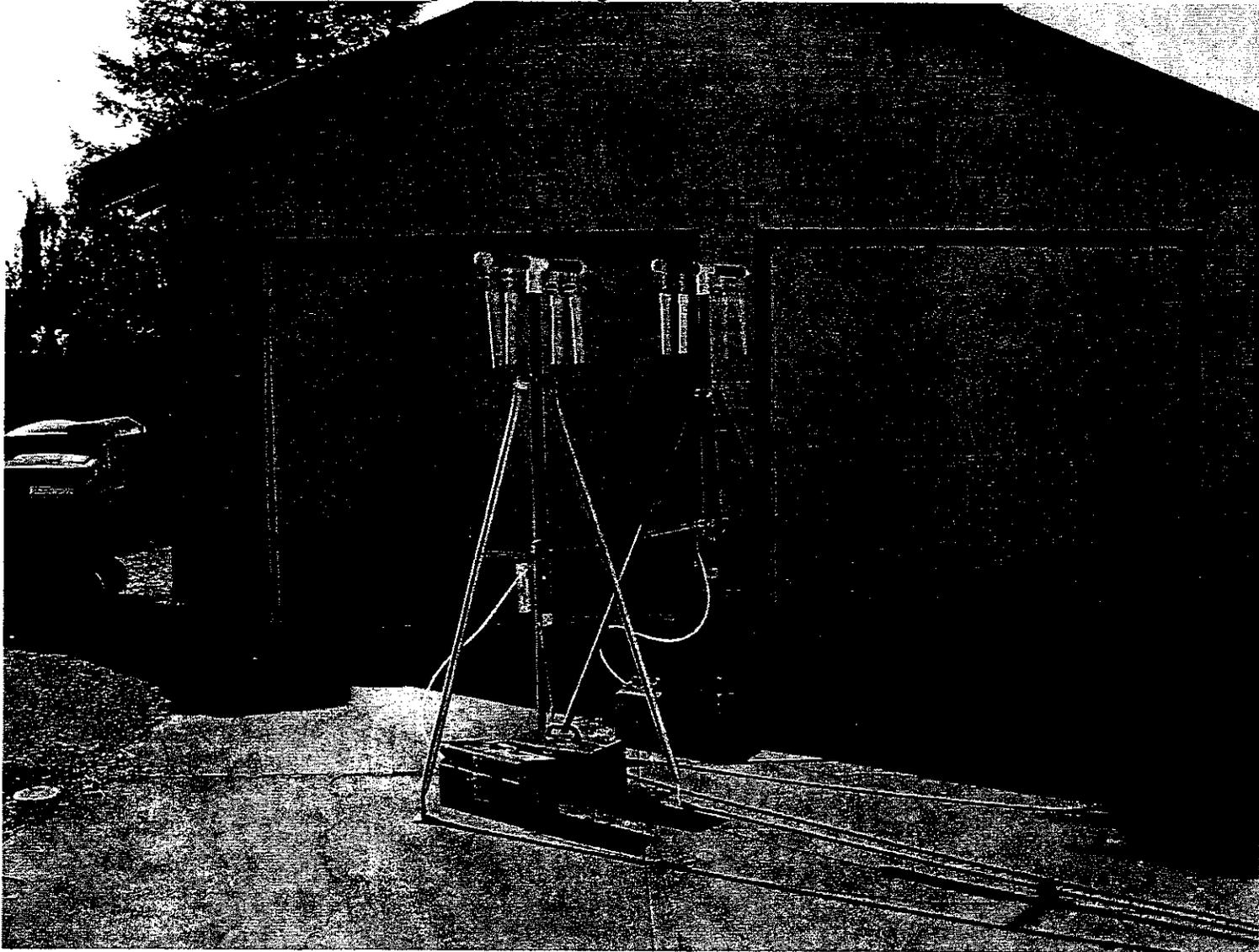


Figure 2
Fumigation Site Diagram

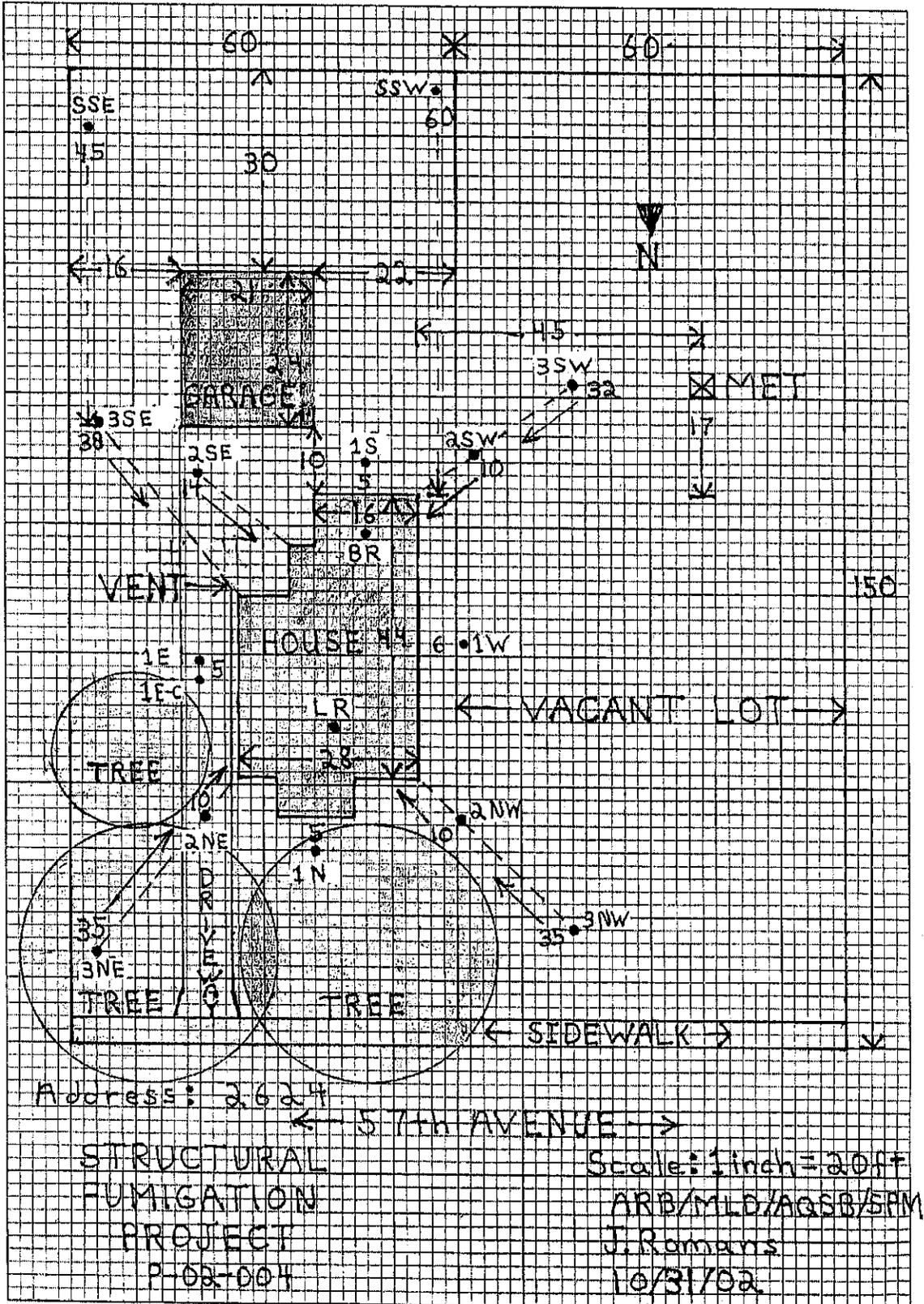


Table 5. Sulfuryl Fluoride Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	Time* (hours)	Volume (m ³)	Sulfuryl Fluoride		
		Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
001	SF2NW-B	10/28/02	1100	23.0	1.26	Det	Det	Det
		10/29/02	1000					
003	SF2SW-B	10/28/02	1101	23.0	1.30	Det	Det	Det
		10/29/02	1002					
005	SF2SE-B	10/28/02	1101	23.1	1.25	Det	Det	Det
		10/29/02	1004					
007	SF2NE-B	10/28/02	1100	23.1	1.24	Det	Det	Det
		10/29/02	1006					
014	SF3NW-1	10/29/02	1121	4.7	0.28	8.27E+00	2.9E+01	7.0E+00
		10/29/02	1604					
015	SF2NW-1	10/29/02	1122	4.7	0.28	3.34E+01	1.2E+02	2.8E+01
		10/29/02	1605					
016	SF1W-1	10/29/02	1122	4.7	0.28	4.83E+01	1.7E+02	4.1E+01
		10/29/02	1606					
017	SF3SW-1	10/29/02	1123	4.7	0.28	1.55E+01	5.5E+01	1.3E+01
		10/29/02	1606					
018	SF2SW-1	10/29/02	1123	4.7	0.28	2.64E+01	9.4E+01	2.2E+01
		10/29/02	1607					
019	SF1S-1	10/29/02	1123	4.8	0.29	5.03E+02	1.7E+03	4.2E+02
		10/29/02	1608					
020	SF2SE-1	10/29/02	1123	4.7	0.28	2.43E+02	8.6E+02	2.1E+02
		10/29/02	1608					
021	SF3SE-1	10/29/02	1124	4.7	0.28	7.75E+01	2.7E+02	6.6E+01
		10/29/02	1609					
022	SF1E-1	10/29/02	1124	4.8	0.29	4.41E+02	1.5E+03	3.7E+02
		10/29/02	1610					
023	SF1E-1-C	10/29/02	1124	4.8	0.29	6.24E+02	2.2E+03	5.2E+02
		10/29/02	1611					
024	SF2NE-1	10/29/02	1125	4.8	0.29	2.31E+02	8.0E+02	1.9E+02
		10/29/02	1612					
025	SF3NE-1	10/29/02	1125	4.7	0.28	6.56E+01	2.3E+02	5.6E+01
		10/29/02	1612					
026	SF1N-1	10/29/02	1125	4.8	0.29	3.01E+02	1.0E+03	2.5E+02
		10/29/02	1613					
027	SF3NW-2	10/29/02	1604	15.5	0.93	1.32E+02	1.4E+02	3.4E+01
		10/30/02	0737					
028	SF2NW-2	10/29/02	1605	15.5	0.93	2.92E+02	3.1E+02	7.5E+01
		10/30/02	0738					
029	SF1W-2	10/29/02	1606	15.5	0.93	4.77E+02	5.1E+02	1.2E+02
		10/30/02	0739					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 0.7ug/sample

Det = Value was below the EQL of 3.5 ug/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 5. Sulfuryl Fluoride Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	Time* (hours)	Volume (m ³)	Sulfuryl Fluoride		
		Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
030	SF3SW-2	10/29/02	1606	15.5	0.93	6.31E+01	6.8E+01	1.6E+01
		10/30/02	0739					
031	SF2SW-2	10/29/02	1607	15.5	0.93	1.63E+02	1.8E+02	4.2E+01
		10/30/02	0740					
032	SF1S2	10/29/02	1608	15.5	0.87	2.01E+02	2.3E+02	5.5E+01
		10/30/02	0740					
033	SF2SE-2	10/29/02	1608	15.5	0.93	1.37E+02	1.5E+02	3.5E+01
		10/30/02	0740					
034	SF3SE-2	10/29/02	1609	15.5	0.93	3.65E+01	3.9E+01	9.4E+00
		10/30/02	0741					
035	SF1E-2	10/29/02	1610	15.5	0.87	2.31E+02	2.7E+02	6.4E+01
		10/30/02	0741					
036	SF1E-2-C	10/29/02	1611	15.5	0.87	2.90E+02	3.3E+02	8.0E+01
		10/30/02	0741					
037	SF2NE-2	10/29/02	1612	15.5	0.88	9.44E+01	1.1E+02	2.6E+01
		10/30/02	0742					
038	SF3NE-2	10/29/02	1612	15.5	0.87	4.79E+01	5.5E+01	1.3E+01
		10/30/02	0742					
039	SF1N-2	10/29/02	1613	15.5	0.93	3.85E+02	4.1E+02	9.9E+01
		10/30/02	0743					
040	SF3NW-3	10/30/02	0737	8.6	0.52	4.11E+00	8.0E+00	1.9E+00
		10/30/02	1606					
041	SF2NW-3	10/30/02	0738	8.5	0.51	5.34E+00	1.0E+01	2.5E+00
		10/30/02	1607					
042	SF1W-3	10/30/02	0739	8.5	0.51	4.14E+01	8.1E+01	1.9E+01
		10/30/02	1607					
043	SF3SW-3	10/30/02	0739	8.5	0.51	1.00E+00	2.0E+00	4.7E-01
		10/30/02	1608					
044	SF2SW-3	10/30/02	0740	8.5	0.51	3.46E+01	6.8E+01	1.6E+01
		10/30/02	1609					
045	SF1S-3	10/30/02	0740	8.5	0.51	8.20E+02	1.6E+03	3.8E+02
		10/30/02	1610					
046	SF2SE-3	10/30/02	0740	8.5	0.51	2.63E+02	5.2E+02	1.2E+02
		10/30/02	1610					
047	SF3SE-3	10/30/02	0741	8.5	0.51	1.14E+02	2.2E+02	5.4E+01
		10/30/02	1611					
048	SF1E-3	10/30/02	0741	8.5	0.51	3.48E+02	6.8E+02	1.6E+02
		10/30/02	1611					
049	SF1E-3-C	10/30/02	0741	8.5	0.51	3.95E+02	7.8E+02	1.9E+02
		10/30/02	1611					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 0.7ug/sample

Det = Value was below the EQL of 3.5 ug/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 5. Sulfuryl Fluoride Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date	Time	Time* (hours)	Volume (m ³)	Sulfuryl Fluoride		
		On Off	On Off			(ng/sample)	(ng/m ³)	** (pptv)
050	SF2NE-3	10/30/02	0742	8.5	0.51	1.68E+01	3.3E+01	7.9E+00
		10/30/02	1612					
051	SF3NE-3	10/30/02	0742	8.6	0.52	Det	Det	Det
		10/30/02	1612					
052	SF1N-3	10/30/02	0743	8.5	0.51	2.22E+01	4.4E+01	1.0E+01
		10/30/02	1613					
053	SF3NW-4	10/30/02	1606	15.4	0.92	4.55E+01	4.9E+01	1.2E+01
		10/31/02	0731					
054	SF2NW-4	10/30/02	1607	15.4	0.92	1.41E+02	1.5E+02	3.7E+01
		10/31/02	0732					
055	SF1W-4	10/30/02	1607	15.4	0.92	2.58E+02	2.8E+02	6.7E+01
		10/31/02	0733					
056	SF3SW-4	10/30/02	1608	15.4	0.85	8.06E+01	9.4E+01	2.3E+01
		10/31/02	0733					
057	SF2SW-4	10/30/02	1609	15.4	0.92	1.85E+02	2.0E+02	4.8E+01
		10/31/02	0734					
058	SF1S-4	10/30/02	1610	15.4	NA	NA	NA	NA
		10/31/02	0734					
059	SF2SE-4	10/30/02	1610	15.4	0.86	3.15E+02	3.7E+02	8.8E+01
		10/31/02	0735					
060	SF3SE-4	10/30/02	1611	15.4	0.92	7.62E+01	8.3E+01	2.0E+01
		10/31/02	0736					
061	SF1E-4	10/30/02	1611	15.4	0.83	7.52E+02	9.1E+02	2.2E+02
		10/31/02	0736					
062	SF1E-4-C	10/30/02	1611	15.4	0.80	7.02E+02	8.7E+02	2.1E+02
		10/31/02	0736					
063	SF2NE-4	10/30/02	1612	15.4	0.84	1.38E+02	1.7E+02	4.0E+01
		10/31/02	0737					
064	SF3NE-4	10/30/02	1612	15.3	0.84	6.97E+01	8.3E+01	2.0E+01
		10/31/02	0738					
065	SF1N-4	10/30/02	1613	15.4	0.87	2.05E+02	2.3E+02	5.6E+01
		10/31/02	0738					
066	SF3NW-5	10/31/02	0846	1.5	0.09	3.54E+00	3.9E+01	9.4E+00
		10/31/02	1018					
067	SF2NW-5	10/31/02	0847	1.5	0.09	Det	Det	Det
		10/31/02	1019					
068	SF1W-5	10/31/02	0847	1.6	0.10	6.17E+01	6.4E+02	1.5E+02
		10/31/02	1020					
069	SF3SW-5	10/31/02	0847	1.6	0.10	3.79E+00	3.9E+01	9.5E+00
		10/31/02	1021					
070	SF2SW-5	10/31/02	0848	1.6	0.10	1.81E+01	1.9E+02	4.5E+01
		10/31/02	1021					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 0.7ug/sample

Det = Value was below the EQL of 3.5 ug/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 5. Sulfuryl Fluoride Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date	Time	Time* (hours)	Volume (m ³)	Sulfuryl Fluoride		
		On	On			(ng/sample)	(ng/m ³)	** (pptv)
		Off	Off					
071	SF1S-5	10/31/02	0848	1.6	0.10	4.33E+02	4.5E+03	1.1E+03
		10/31/02	1022					
072	SF2SE-5-FE	10/31/02	0849	1.6	0.10	3.31E+02	3.4E+03	8.3E+02
		10/31/02	1024					
073	SF3SE-5-FE	10/31/02	0855	1.6	0.10	2.24E+02	2.3E+03	5.6E+02
		10/31/02	1027					
074	SF1E-5	10/31/02	0850	1.6	0.10	2.36E+02	2.5E+03	5.9E+02
		10/31/02	1025					
075	SF1E-5-C	10/31/02	0850	1.6	0.10	2.53E+02	2.6E+03	6.3E+02
		10/31/02	1025					
076	SF2NE-5	10/31/02	0851	1.6	0.10	Det	Det	Det
		10/31/02	1025					
077	SF3NE-5	10/31/02	0851	1.6	0.10	Det	Det	Det
		10/31/02	1026					
078	SF1N-5	10/31/02	0851	1.6	0.10	Det	Det	Det
		10/31/02	1026					
079	FSSW-5-F	10/31/02	0848	1.6	0.10	7.39E+01	7.7E+02	1.8E+02
		10/31/02	1022					
080	SFSSE-5-FE	10/31/02	0849	1.6	0.10	9.19E+01	9.6E+02	2.3E+02
		10/31/02	1023					
081	SF3NW-6	10/31/02	1018	5.7	0.34	7.92E+00	2.3E+01	5.5E+00
		10/31/02	1600					
082	SF2NW-6	10/31/02	1019	5.7	0.34	4.00E+00	1.2E+01	2.8E+00
		10/31/02	1600					
083	SF1W-6	10/31/02	1020	5.7	0.34	Det	Det	Det
		10/31/02	1600					
084	SF3SW-6	10/31/02	1021	5.7	0.34	Det	Det	Det
		10/31/02	1601					
085	SF2SW-6	10/31/02	1021	5.6	0.34	Det	Det	Det
		10/31/02	1602					
086	SF1S-6	10/31/02	1022	5.6	0.34	5.40E+01	1.6E+02	3.8E+01
		10/31/02	1602					
087	SF2SE-6	10/31/02	1024	5.7	0.34	1.85E+01	5.4E+01	1.3E+01
		10/31/02	1604					
088	SF3SE-6	10/31/02	1027	5.6	0.34	6.01E+00	1.8E+01	4.3E+00
		10/31/02	1605					
089	SF1E-6	10/31/02	1025	5.6	0.34	3.76E+01	1.1E+02	2.7E+01
		10/31/02	1605					
090	SF1E-6-C	10/31/02	1025	5.7	0.34	3.81E+01	1.1E+02	2.7E+01
		10/31/02	1606					
091	SF2NE-6	10/31/02	1025	5.7	0.34	Det	Det	Det
		10/31/02	1606					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 0.7ug/sample

Det = Value was below the EQL of 3.5 ug/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 5. Sulfuryl Fluoride Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date	Time	Time* (hours)	Volume (m ³)	Sulfuryl Fluoride		
		On Off	On Off			(ng/sample)	(ng/m ³)	** (pptv)
092	SF3NE-6	10/31/02	1026	5.7	0.34	Det	Det	Det
		10/31/02	1607					
093	SF1N-6	10/31/02	1026	5.6	0.34	Det	Det	Det
		10/31/02	1608					
094	SFSSW-6	10/31/02	1022	5.7	0.34	3.52E+00	1.0E+01	2.5E+00
		10/31/02	1603					
095	SFSSE-6	10/31/02	1023	5.6	0.34	Det	Det	Det
		10/31/02	1604					
096	SF3NW-7	10/31/02	1600	15.7	0.94	4.27E+00	4.5E+00	1.1E+00
		11/01/02	0742					
097	SF2NW-7	10/31/02	1600	15.7	0.94	4.81E+00	5.1E+00	1.2E+00
		11/01/02	0742					
098	SF1W-7	10/31/02	1600	15.6	0.88	3.62E+00	4.1E+00	9.8E-01
		11/01/02	0743					
099	SF3SW-7	10/31/02	1601	15.7	0.94	Det	Det	Det
		11/01/02	0743					
100	SF2SW-7	10/31/02	1602	15.7	0.94	6.07E+00	6.4E+00	1.5E+00
		11/01/02	0744					
101	SF1S-7	10/31/02	1602	15.7	0.89	1.19E+01	1.3E+01	3.2E+00
		11/01/02	0744					
102	SF2SE-7	10/31/02	1604	15.6	0.88	9.77E+00	1.1E+01	2.7E+00
		11/01/02	0745					
103	SF3SE-7	10/31/02	1605	15.7	0.94	7.52E+00	8.0E+00	1.9E+00
		11/01/02	0746					
104	SF1E-7	10/31/02	1605	15.7	NA	NA	NA	NA
		11/01/02	0746					
105	SF1E-7-C	10/31/02	1606	15.6	0.86	2.02E+01	2.3E+01	5.6E+00
		11/01/02	0747					
106	SF2NE-7	10/31/02	1606	15.6	0.88	Det	Det	Det
		11/01/02	0747					
107	SF3NE-7	10/31/02	1607	15.7	0.94	Det	Det	Det
		11/01/02	0748					
108	SF1N-7	10/31/02	1608	15.7	0.94	Det	Det	Det
		11/01/02	0748					
109	SF3NW-8	11/01/02	0742	8.3	0.50	3.92E+00	7.9E+00	1.9E+00
		11/01/02	1559					
110	SF2NW-8	11/01/02	0742	8.3	0.50	Det	Det	Det
		11/01/02	1559					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 0.7ug/sample

Det = Value was below the EQL of 3.5 ug/sample but \geq MDL

NA = Not Applicable (sampling problem)

Table 5. Sulfuryl Fluoride Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date		Time* (hours)	Volume (m ³)	Sulfuryl Fluoride		
		On	Off			(ng/sample)	(ng/m ³)	** (pptv)
111	SF1W-8	11/01/02	0743	8.3	0.50	3.68E+00	7.4E+00	1.8E+00
		11/01/02	1600					
112	SF3SW-8	11/01/02	0743	8.2	0.49	Det	Det	Det
		11/01/02	1601					
113	SF2SW-8	11/01/02	0744	8.3	0.50	4.89E+00	9.8E+00	2.4E+00
		11/01/02	1602					
114	SF1S-8	11/01/02	0744	8.3	0.50	6.42E+00	1.3E+01	3.1E+00
		11/01/02	1602					
115	SF2SE-8	11/01/02	0745	8.3	0.50	Det	Det	Det
		11/01/02	1603					
116	SF3SE-8	11/01/02	0746	8.3	0.50	4.86E+00	9.8E+00	2.3E+00
		11/01/02	1604					
117	SF1E-8	11/01/02	0746	8.6	0.52	Det	Det	Det
		11/01/02	1604					
118	SF1E-8-C	11/01/02	0747	8.3	0.50	Det	Det	Det
		11/01/02	1605					
119	SF2NE-8	11/01/02	0747	8.3	0.50	Det	Det	Det
		11/01/02	1606					
120	SF3NE-8	11/01/02	0748	8.3	0.50	Det	Det	Det
		11/01/02	1606					
121	SF1N-8	11/01/02	0748	8.3	0.50	Det	Det	Det
		11/01/02	1607					
122	SFLR-01	11/01/02	0914	23.6	1.32	9.81E+01	7.4E+01	1.8E+01
		11/02/02	0854					
123	SFBR-01	11/01/02	0915	23.7	1.42	1.16E+02	8.1E+01	1.9E+01
		11/02/02	0856					
124	SF3NW-9	11/01/02	1559	15.8	0.90	Det	Det	Det
		11/02/02	0745					
125	SF2NW-9	11/01/02	1559	15.8	0.90	4.43E+00	4.9E+00	1.2E+00
		11/02/02	0748					
126	SF1W-9	11/01/02	1600	15.8	0.89	Det	Det	Det
		11/02/02	0749					
127	SF3SW-9	11/01/02	1601	15.8	0.95	Det	Det	Det
		11/02/02	0750					
128	SF2SW-9	11/01/02	1602	15.8	0.89	Det	Det	Det
		11/02/02	0750					
129	SF1S-9	11/01/02	1602	15.8	NA	NA	NA	NA
		11/02/02	0751					
130	SF2SE-9	11/01/02	1603	15.8	NA	NA	NA	NA
		11/02/02	0752					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 0.7ug/sample

Det = Value was below the EQL of 3.5 ug/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 5. Sulfuryl Fluoride Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	Time* (hours)	Volume (m ³)	Sulfuryl Fluoride		
		Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
131	SF3SE-9	11/01/02	1604	15.8	0.86	Det	Det	Det
		11/02/02	0752					
132	SF1E-9	11/01/02	1604	15.8	0.87	Det	Det	Det
		11/02/02	0753					
133	SF1E-9-C	11/01/02	1605	15.8	0.87	Det	Det	Det
		11/02/02	0753					
134	SF2NE-9	11/01/02	1606	15.8	NA	Det	Det	Det
		11/02/02	0754					
135	SF3NE-9	11/01/02	1606	15.8	0.95	Det	Det	Det
		11/02/02	0755					
136	SF1N-9	11/01/02	1607	15.8	0.95	Det	Det	Det
		11/02/02	0755					
137	SF3NW-10	11/02/02	0745	8.2	0.49	Det	Det	Det
		11/02/02	1558					
138	SF2NW-10	11/02/02	0748	8.2	0.49	Det	Det	Det
		11/02/02	1600					
139	SF1W-10	11/02/02	0749	8.2	0.49	Det	Det	Det
		11/02/02	1601					
140	SF2SW-10	11/02/02	0750	8.3	0.50	Det	Det	Det
		11/02/02	1603					
141	SF2SW-10	11/02/02	0750	8.3	0.50	Det	Det	Det
		11/02/02	1604					
142	SF1S-10	11/02/02	0751	8.3	0.50	Det	Det	Det
		11/02/02	1606					
143	SF2SE-10	11/02/02	0752	8.3	0.50	5.02E+00	1.0E+01	2.4E+00
		11/02/02	1608					
144	SF3SE-10	11/02/02	0752	8.2	0.49	Det	Det	Det
		11/02/02	1609					
145	SF1E-10	11/02/02	0753	8.3	0.50	Det	Det	Det
		11/02/02	1610					
146	SF1E-10-C	11/02/02	0753	8.3	0.50	Det	Det	Det
		11/02/02	1611					
147	SF2NE-10	11/02/02	0754	8.3	0.50	Det	Det	Det
		11/02/02	1613					
148	SF3NE-10	11/02/02	0755	8.3	0.50	Det	Det	Det
		11/02/02	1614					
149	SF1N-10	11/02/02	0755	8.3	0.50	Det	Det	Det
		11/02/02	1615					
150	SFLR-02	11/02/02	0854	24.2	1.45	4.94E+01	3.4E+01	8.2E+00
		11/03/02	0904					
151	SFBR-02	11/02/02	0856	24.1	1.45	7.17E+01	5.0E+01	1.2E+01
		11/03/02	0905					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 0.7ug/sample

Det = Value was below the EQL of 3.5 ug/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 6. Chloropicrin Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	ETM On	Time* (hours)	Volume (m ³)	Chloropicrin		
		Off	Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
001	C2NW-B	10/28/02	1100	328.80	23.0	0.12	<MDL	<MDL	<MDL
		10/29/02	1000	351.80					
003	C2SW-B	10/28/02	1101	303.50	23.0	0.12	<MDL	<MDL	<MDL
		10/29/02	1002	326.50					
005	C2SE-B	10/28/02	1101	51.70	23.1	0.12	<MDL	<MDL	<MDL
		10/29/02	1004	74.80					
007	C2NE-B	10/28/02	1100	705.10	23.1	0.12	<MDL	<MDL	<MDL
		10/29/02	1006	728.20					
014	C3NW-1	10/29/02	1121	190.80	4.7	0.03	<MDL	<MDL	<MDL
		10/29/02	1604	195.50					
015	C2NW-1	10/29/02	1122	351.80	4.7	0.03	<MDL	<MDL	<MDL
		10/29/02	1605	356.50					
016	C1W-1	10/29/02	1122	410.30	4.7	0.03	<MDL	<MDL	<MDL
		10/29/02	1606	415.00					
017	C3SW-1	10/29/02	1123	418.30	4.7	0.03	<MDL	<MDL	<MDL
		10/29/02	1606	423.00					
018	C2SW-1	10/29/02	1123	326.50	4.7	0.03	<MDL	<MDL	<MDL
		10/29/02	1607	331.20					
019	C1S-1	10/29/02	1123	298.00	4.8	0.03	6.07E+01	2.3E+03	3.5E+02
		10/29/02	1608	302.80					
020	C2SE-1	10/29/02	1123	74.80	4.7	0.03	3.88E+01	1.5E+03	2.3E+02
		10/29/02	1608	79.50					
021	C3SE-1	10/29/02	1124	287.10	4.7	0.03	<MDL	<MDL	<MDL
		10/29/02	1609	291.80					
022	C1E-1	10/29/02	1124	189.00	4.8	0.03	7.90E+01	3.0E+03	4.5E+02
		10/29/02	1610	193.80					
023	C1E-1C	10/29/02	1124	235.00	4.5	0.02	8.27E+01	3.4E+03	5.1E+02
		10/29/02	1611	239.50					
024	C2NE-1	10/29/02	1125	728.20	4.8	0.03	2.93E+01	1.1E+03	1.7E+02
		10/29/02	1612	733.00					
025	C3NE-1	10/29/02	1125	85.80	4.7	0.03	Det	Det	Det
		10/29/02	1612	90.50					
026	C1N-1	10/29/02	1125	53.70	4.8	0.03	5.28E+01	2.0E+03	3.0E+02
		10/29/02	1613	58.50					
027	C3NW-2	10/29/02	1604	195.50	15.5	0.08	3.86E+01	4.6E+02	6.9E+01
		10/30/02	0737	211.00					
028	C2NW-2	10/29/02	1605	356.50	15.5	0.09	1.40E+02	1.6E+03	2.4E+02
		10/30/02	0738	372.00					
029	C1W-2	10/29/02	1606	415.00	15.5	0.09	3.09E+02	3.5E+03	5.2E+02
		10/30/02	0739	430.50					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 3.96 ng/sample

Det = Value was below the EQL of 19.8 ng/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 6. Chloropicrin Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	ETM On	Time* (hours)	Volume (m ³)	Chloropicrin		
		Off	Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
030	C3SW-2	10/29/02	1606	423.00	15.5	0.08	3.41E+01	4.1E+02	6.1E+01
		10/30/02	0739	438.50					
031	C2SW-2	10/29/02	1607	331.20	15.5	0.08	8.66E+01	1.0E+03	1.5E+02
		10/30/02	0740	346.70					
032	C1S-2	10/29/02	1608	302.80	15.5	0.08	1.36E+02	1.6E+03	2.4E+02
		10/30/02	0740	318.30					
033	C2SE-2	10/29/02	1608	79.50	15.5	0.08	8.30E+01	9.9E+02	1.5E+02
		10/30/02	0740	95.00					
034	C3SE-2	10/29/02	1609	291.80	15.5	0.08	Det	Det	Det
		10/30/02	0741	307.30					
035	C1E-2	10/29/02	1610	193.80	15.5	0.08	1.57E+02	1.9E+03	2.8E+02
		10/30/02	0741	209.30					
036	C1E-2-C	10/29/02	1611	239.80	15.5	0.08	1.72E+02	2.1E+03	3.1E+02
		10/30/02	0741	255.30					
037	C2NE-2	10/29/02	1612	733.00	15.5	0.08	4.07E+01	4.9E+02	7.2E+01
		10/30/02	0742	748.50					
038	C3NE-2	10/29/02	1612	90.50	15.5	0.08	Det	Det	Det
		10/30/02	0742	106.00					
039	C1N-2	10/29/02	1613	58.50	15.5	0.08	1.86E+02	2.2E+03	3.3E+02
		10/30/02	0743	74.00					
040	C3NW-3	10/30/02	0737	211.00	8.6	0.05	<MDL	<MDL	<MDL
		10/30/02	1606	219.60					
041	C2NW-3	10/30/02	0738	372.00	8.5	0.05	<MDL	<MDL	<MDL
		10/30/02	1607	380.50					
042	C1W-3	10/30/02	0739	430.50	8.5	0.05	Det	Det	Det
		10/30/02	1607	439.00					
043	C3SW-3	10/30/02	0739	438.50	8.5	0.05	<MDL	<MDL	<MDL
		10/30/02	1608	447.00					
044	C2SW-3	10/30/02	0740	346.70	8.5	0.05	<MDL	<MDL	<MDL
		10/30/02	1609	355.20					
045	C1S-3	10/30/02	0740	318.30	8.5	0.05	1.16E+02	2.5E+03	3.8E+02
		10/30/02	1610	326.80					
046	C2SE-3	10/30/02	0740	95.00	8.5	0.05	5.81E+01	1.3E+03	1.9E+02
		10/30/02	1610	103.50					
047	C3SE-3	10/30/02	0741	307.30	8.5	0.05	Det	Det	Det
		10/30/02	1611	315.80					
048	C1E-3	10/30/02	0741	209.30	8.5	0.05	6.95E+01	1.5E+03	2.3E+02
		10/30/02	1611	217.80					
049	C1E-3-C	10/30/02	0741	255.30	8.5	0.05	7.64E+01	1.7E+03	2.5E+02
		10/30/02	1611	263.80					
050	C2NE-3	10/30/02	0742	748.50	8.5	0.05	<MDL	<MDL	<MDL
		10/30/02	1612	757.00					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 3.96 ng/sample

Det = Value was below the EQL of 19.8 ng/sample but \geq MDL

NA = Not Applicable (sampling problem)

Table 6. Chloropicrin Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	ETM On	Time* (hours)	Volume (m ³)	Chloropicrin		
		Off	Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
051	C3NE-3	10/30/02	0742	106.00	8.6	0.05	<MDL	<MDL	<MDL
		10/30/02	1612	114.60					
052	C1N-3	10/30/02	0743	74.00	8.5	0.05	<MDL	<MDL	<MDL
		10/30/02	1613	82.50					
053	C3NW-4	10/30/02	1606	219.60	15.4	0.08	3.06E+01	3.7E+02	5.5E+01
		10/31/02	0731	235.00					
054	C2NW-4	10/30/02	1607	380.50	15.4	0.08	7.85E+01	9.4E+02	1.4E+02
		10/31/02	0732	395.90					
055	C1W-4	10/30/02	1607	439.00	15.4	0.09	1.78E+02	2.0E+03	3.0E+02
		10/31/02	0733	454.40					
056	C3SW-4	10/30/02	1608	447.00	15.4	0.09	4.70E+01	5.4E+02	8.0E+01
		10/31/02	0733	462.40					
057	C2SW-4	10/30/02	1609	355.20	15.4	0.09	1.06E+02	1.2E+03	1.7E+02
		10/31/02	0734	370.60					
058	C1S-4	10/30/02	1610	326.80	15.4	0.08	1.57E+02	1.9E+03	2.8E+02
		10/31/02	0734	342.20					
059	C2SE-4	10/30/02	1610	103.50	15.4	0.08	1.96E+02	2.4E+03	3.5E+02
		10/31/02	0735	118.90					
060	C3SE-4	10/30/02	1611	315.80	15.4	0.08	4.42E+01	5.3E+02	7.9E+01
		10/31/02	0736	331.20					
061	C1E-4	10/30/02	1611	217.80	15.4	0.08	3.97E+02	4.8E+03	7.1E+02
		10/31/02	0736	233.20					
062	C1E-4-C	10/30/02	1611	263.80	15.4	0.08	2.06E+02	2.5E+03	3.7E+02
		10/31/02	0736	279.20					
063	C2NE-4	10/30/02	1612	757.00	15.4	0.08	8.39E+01	1.0E+03	1.5E+02
		10/31/02	0737	772.40					
064	C3NE-4	10/30/02	1612	114.60	15.3	0.08	3.45E+01	4.2E+02	6.2E+01
		10/31/02	0738	129.90					
065	C1N-4	10/30/02	1613	82.50	15.4	0.08	1.22E+02	1.5E+03	2.2E+02
		10/31/02	0738	97.90					
066	C3NW-5	10/31/02	0846	235.00	1.5	0.01	<MDL	<MDL	<MDL
		10/31/02	1018	236.50					
067	C2NW-5	10/31/02	0847	395.90	1.5	0.01	<MDL	<MDL	<MDL
		10/31/02	1019	397.40					
068	C1W-5	10/31/02	0847	454.40	1.6	0.01	Det	Det	Det
		10/31/02	1020	456.00					
069	C3SW-5	10/31/02	0847	462.40	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1021	464.00					
070	C2SW-5	10/31/02	0848	370.60	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1021	372.20					
071	C1S-5	10/31/02	0848	342.20	1.6	0.01	2.50E+02	2.9E+04	4.3E+03
		10/31/02	1022	343.80					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 3.96 ng/sample

Det = Value was below the EQL of 19.8 ng/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 6. Chloropicrin Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	ETM On	Time* (hours)	Volume (m ³)	Chloropicrin		
		Off	Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
072	C2SE-5-F	10/31/02	0849	118.90	1.6	0.01	7.85E+01	9.1E+03	1.4E+03
		10/31/02	1024	120.50					
072A	C2SE-5-B	10/31/02	0849	118.90	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1024	120.50					
073	C3SE-5-F	10/31/02	0855	331.20	1.6	0.01	3.24E+01	3.7E+03	5.6E+02
		10/31/02	1027	332.80					
73A	C3SE-5-B	10/31/02	0855	331.20	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1027	332.80					
074	C1E-5	10/31/02	0850	233.20	1.6	0.01	7.62E+01	8.8E+03	1.3E+03
		10/31/02	1025	234.80					
075	C1E-5-C	10/31/02	0850	279.20	1.6	0.01	1.02E+02	1.2E+04	1.8E+03
		10/31/02	1025	280.80					
076	C2NE-5	10/31/02	0851	772.40	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1025	774.00					
077	C3NE-5	10/31/02	0851	129.90	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1026	131.50					
078	C1N-5	10/31/02	0851	97.90	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1026	99.50					
079	CSSW-5-F	10/31/02	0848	7.80	1.6	0.01	Det	Det	Det
		10/31/02	1022	9.40					
79A	CSSW-5-E	10/31/02	0848	7.80	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1022	9.40					
080	CSSE-5-F	10/31/02	0849	165.30	1.6	0.01	2.12E+01	2.5E+03	3.6E+02
		10/31/02	1023	166.90					
80A	CSSE-5-B	10/31/02	0849	165.30	1.6	0.01	<MDL	<MDL	<MDL
		10/31/02	1023	166.90					
081	C3NW-6	10/31/02	1018	236.50	5.7	0.03	<MDL	<MDL	<MDL
		10/31/02	1600	242.20					
082	C2NW-6	10/31/02	1019	397.40	5.7	0.03	<MDL	<MDL	<MDL
		10/31/02	1600	403.10					
083	C1W-6	10/31/02	1020	456.00	5.7	0.03	<MDL	<MDL	<MDL
		10/31/02	1600	461.70					
084	C3SW-6	10/31/02	1021	464.00	5.7	0.03	<MDL	<MDL	<MDL
		10/31/02	1601	469.70					
085	C2SW-6	10/31/02	1021	372.20	5.6	0.03	<MDL	<MDL	<MDL
		10/31/02	1602	377.80					
086	C1S-6	10/31/02	1022	343.80	5.6	0.03	1.53E+02	5.1E+03	7.5E+02
		10/31/02	1602	349.40					
087	C2SE-6	10/31/02	1024	120.50	5.7	0.03	5.09E+01	1.7E+03	2.5E+02
		10/31/02	1604	126.20					
088	C3SE-6	10/31/02	1027	332.80	5.6	0.03	2.25E+01	7.4E+02	1.1E+02
		10/31/02	1605	338.40					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 3.96 ng/sample

Det = Value was below the EQL of 19.8 ng/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 6. Chloropicrin Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	ETM On	Time* (hours)	Volume (m ³)	Chloropicrin		
		Off	Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
089	C1E-6	10/31/02	1025	234.80	5.6	0.03	8.28E+01	2.7E+03	4.1E+02
		10/31/02	1605	240.40					
090	C1E-6-C	10/31/02	1025	280.80	5.7	0.03	1.00E+02	3.3E+03	4.8E+02
		10/31/02	1606	286.50					
091	C2NE-6	10/31/02	1025	774.00	5.7	0.03	<MDL	<MDL	<MDL
		10/31/02	1606	779.70					
092	C3NE-6	10/31/02	1026	131.50	5.7	0.03	<MDL	<MDL	<MDL
		10/31/02	1607	137.20					
093	C1N-6	10/31/02	1026	99.50	5.6	0.03	<MDL	<MDL	<MDL
		10/31/02	1608	105.10					
094	CSSW-6	10/31/02	1022	9.40	5.7	0.03	Det	Det	Det
		10/31/02	1603	15.10					
095	CSSE-6	10/31/02	1023	166.90	5.6	0.03	Det	Det	Det
		10/31/02	1604	172.50					
096	C3NW-7	10/31/02	1600	242.20	15.7	0.09	Det	Det	Det
		11/01/02	0742	257.90					
097	C2NW-7	10/31/02	1600	403.10	15.7	0.08	2.22E+01	2.6E+02	3.9E+01
		11/01/02	0742	418.80					
098	C1W-7	10/31/02	1600	461.70	15.6	0.09	7.68E+01	8.6E+02	1.3E+02
		11/01/02	0743	477.30					
099	C3SW-7	10/31/02	1601	469.70	15.7	0.09	Det	Det	Det
		11/01/02	0743	485.40					
100	C2SW-7	10/31/02	1602	377.80	15.7	0.08	5.03E+01	5.9E+02	8.8E+01
		11/01/02	0744	393.50					
101	C1S-7	10/31/02	1602	349.40	15.7	0.09	9.94E+01	1.1E+03	1.7E+02
		11/01/02	0744	365.10					
102	C2SE-7	10/31/02	1604	126.20	15.6	0.09	1.05E+02	1.2E+03	1.7E+02
		11/01/02	0745	141.80					
103	C3SE-7	10/31/02	1605	338.40	15.7	0.08	2.87E+01	3.4E+02	5.0E+01
		11/01/02	0746	354.10					
104	C1E-7	10/31/02	1605	240.40	NA	NA	NA	NA	NA
		11/01/02	0746	256.10					
105	C1E-7-C	10/31/02	1606	286.50	15.6	0.08	1.45E+02	1.7E+03	2.6E+02
		11/01/02	0747	302.10					
106	C2NE-7	10/31/02	1606	779.70	15.6	0.08	2.82E+01	3.3E+02	5.0E+01
		11/01/02	0747	795.30					
107	C3NE-7	10/31/02	1607	137.20	15.7	0.08	Det	Det	Det
		11/01/02	0748	152.90					
108	C1N-7	10/31/02	1608	105.10	15.7	0.08	3.54E+01	4.2E+02	6.2E+01
		11/01/02	0748	120.80					
109	C3NW-8	11/01/02	0742	257.90	8.3	0.04	<MDL	<MDL	<MDL
		11/01/02	1559	266.20					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 3.96 ng/sample

Det = Value was below the EQL of 19.8 ng/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 6. Chloropicrin Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	ETM On	Time* (hours)	Volume (m ³)	Chloropicrin		
		Off	Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
110	C2NW-8	11/01/02	0742	418.80	8.3	0.04	<MDL	<MDL	<MDL
		11/01/02	1559	427.10					
111	C1W-8	11/01/02	0743	477.30	8.3	0.04	<MDL	<MDL	<MDL
		11/01/02	1600	485.60					
112	C3SW-8	11/01/02	0743	485.40	8.2	0.04	<MDL	<MDL	<MDL
		11/01/02	1601	493.60					
113	C2SW-8	11/01/02	0744	393.50	8.3	0.04	<MDL	<MDL	<MDL
		11/01/02	1602	401.80					
114	C1S-8	11/01/02	0744	365.10	8.3	0.04	Det	Det	Det
		11/01/02	1602	373.40					
115	C2SE-8	11/01/02	0745	141.80	8.3	0.04	Det	Det	Det
		11/01/02	1603	150.10					
116	C3SE-8	11/01/02	0746	354.10	8.3	0.04	<MDL	<MDL	<MDL
		11/01/02	1604	362.40					
117	C1E-8	11/01/02	0746	122.00	8.6	0.05	Det	Det	Det
		11/01/02	1604	130.60					
118	C1E-8-C	11/01/02	0747	302.10	8.3	0.04	Det	Det	Det
		11/01/02	1605	310.40					
119	C2NE-8	11/01/02	0747	795.30	8.3	0.04	<MDL	<MDL	<MDL
		11/01/02	1606	803.60					
120	C3NE-8	11/01/02	0748	152.90	8.3	0.04	<MDL	<MDL	<MDL
		11/01/02	1606	161.20					
121	C1N-8	11/01/02	0748	120.80	8.3	0.04	<MDL	<MDL	<MDL
		11/01/02	1607	129.10					
122	CLR-01	11/01/02	0914	172.60	23.6	0.13	2.60E+02	2.0E+03	3.0E+02
		11/02/02	0854	196.20					
123	CBR-01	11/01/02	0915	15.10	23.7	0.13	2.08E+02	1.6E+03	2.4E+02
		11/02/02	0856	38.80					
124	C3NW-9	11/01/02	1559	266.20	15.8	0.09	<MDL	<MDL	<MDL
		11/02/02	0745	282.00					
125	C2NW-9	11/01/02	1559	427.10	15.8	0.09	<MDL	<MDL	<MDL
		11/02/02	0748	442.90					
126	C1W-9	11/01/02	1600	485.60	15.8	0.09	5.53E+01	6.1E+02	9.1E+01
		11/02/02	0749	501.40					
127	C3SW-9	11/01/02	1601	493.60	15.8	0.09	1.99E+01	2.2E+02	3.2E+01
		11/02/02	0750	509.40					
128	C2SW-9	11/01/02	1602	401.80	15.8	0.09	4.09E+01	4.8E+02	7.1E+01
		11/02/02	0750	417.60					
129	C1S-9	11/01/02	1602	373.40	15.8	0.09	3.18E+01	3.7E+02	5.5E+01
		11/02/02	0751	389.20					
130	C2SE-9	11/01/02	1603	150.10	15.8	0.09	3.50E+01	4.1E+02	6.1E+01
		11/02/02	0752	165.90					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 3.96 ng/sample

Det = Value was below the EQL of 19.8 ng/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 6. Chloropicrin Monitoring Results From The Structural Fumigation Study

Log #	Sample ID	Date On	Time On	ETM On	Time* (hours)	Volume (m ³)	Chloropicrin		
		Off	Off	Off			(ng/sample)	(ng/m ³)	** (pptv)
131	C3SE-9	11/01/02	1604	362.40	15.8	0.09	<MDL	<MDL	<MDL
		11/02/02	0752	378.20					
132	C1E-9	11/01/02	1604	130.60	15.8	0.09	3.50E+01	4.1E+02	6.1E+01
		11/02/02	0753	146.40					
133	C1E-9-C	11/01/02	1605	310.40	15.8	0.09	3.35E+01	3.9E+02	5.8E+01
		11/02/02	0753	326.20					
134	C2NE-9	11/01/02	1606	803.60	15.8	0.09	Det	Det	Det
		11/02/02	0754	819.40					
135	C3NE-9	11/01/02	1606	161.20	15.8	0.09	<MDL	<MDL	<MDL
		11/02/02	0755	177.00					
136	C1N-9	11/01/02	1607	129.10	15.8	0.09	<MDL	<MDL	<MDL
		11/02/02	0755	144.90					
137	C3NW-10	11/02/02	0745	282.00	8.2	0.04	<MDL	<MDL	<MDL
		11/02/02	1558	290.20					
138	C2NW-10	11/02/02	0748	442.90	8.2	0.04	<MDL	<MDL	<MDL
		11/02/02	1600	451.10					
139	C1W-10	11/02/02	0749	501.40	8.2	0.04	<MDL	<MDL	<MDL
		11/02/02	1601	509.60					
140	C3SW-10	11/02/02	0750	509.40	8.3	0.04	<MDL	<MDL	<MDL
		11/02/02	1603	517.70					
141	C2SW-10	11/02/02	0750	417.60	8.3	0.04	<MDL	<MDL	<MDL
		11/02/02	1604	425.90					
142	C1S-10	11/02/02	0751	389.20	NA	NA	NA	NA	NA
		11/02/02	1606	397.50					
143	C2SE-10	11/02/02	0752	165.90	8.3	0.04	<MDL	<MDL	<MDL
		11/02/02	1608	174.20					
144	C3SE-10	11/02/02	0752	378.20	8.2	0.04	<MDL	<MDL	<MDL
		11/02/02	1609	386.40					
145	C1E-10	11/02/02	0753	146.40	8.3	0.04	<MDL	<MDL	<MDL
		11/02/02	1610	154.70					
146	C1E-10-C	11/02/02	0753	326.20	8.3	0.04	<MDL	<MDL	<MDL
		11/02/02	1611	334.50					
147	C2NE-10	11/02/02	0754	819.40	8.3	0.04	<MDL	<MDL	<MDL
		11/02/02	1613	827.70					
148	C3NE-10	11/02/02	0755	117.00	68.3	0.37	<MDL	<MDL	<MDL
		11/02/02	1614	185.30					
149	C1N-10	11/02/02	0755	144.90	8.3	0.04	<MDL	<MDL	<MDL
		11/02/02	1615	153.20					
150	CLR-02	11/02/02	0854	196.20	24.2	0.13	1.81E+02	1.4E+03	2.1E+02
		11/03/02	0904	220.40					
151	CBR-02	11/02/02	0856	38.80	24.1	0.13	1.24E+02	9.5E+02	1.4E+02
		11/03/02	0905	62.90					

*From elapsed time meter

**pptv at 1 atm and 25 C

MDL = 3.96 ng/sample

Det = Value was below the EQL of 19.8 ng/sample but ≥MDL

NA = Not Applicable (sampling problem)

Table 7. Summary of Chloropicrin Monitoring Results (ng/m3)

Sampling Period	C3NW	C3SW	C3SE	C3NE	C2NW	C2SW	C2SE	C2NE	C1N	C1W	C1S	C1E	C1EC	SSE	SSW
Background					<MDL	<MDL	<MDL	<MDL							
Period 1	<MDL	<MDL	<MDL	Det	<MDL	<MDL	1500	1100	2000	<MDL	2300	3000	3400		
Period 2	460	410	Det	Det	1600	1000	990	490	2200	3500	1600	1900	2100		
Period 3	<MDL	<MDL	Det	<MDL	<MDL	<MDL	1300	<MDL	<MDL	Det	2500	1500	1700		
Period 4	370	540	530	420	940	1200	2400	1000	1500	2000	1900	4800	2500		
Period 5	<MDL	<MDL	3700	<MDL	<MDL	<MDL	9100	<MDL	<MDL	Det	29000	8800	12000	2500	Det
Period 6	<MDL	<MDL	740	<MDL	<MDL	<MDL	1700	<MDL	<MDL	<MDL	5100	2700	3300	Det	Det
Period 7	Det	Det	340	Det	260	590	1200	330	420	860	1100	NA	1700		
Period 8	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	Det	<MDL	<MDL	<MDL	Det	Det	Det		
Period 9	<MDL	220	<MDL	<MDL	<MDL	480	410	Det	<MDL	610	370	410	390		
Period 10	<MDL	NA	<MDL	<MDL											

Table 8. Chloropicrin Collocated Results From The Structural Fumigation Study

Log #	Sample ID	Chloropicrin (ng/m ³)	Average	RPD (percent)
022	C1E-1	3.0E+03	3.2E+03	11.0
023	C1E-1C	3.4E+03		
035	C1E-2	1.9E+03	2.0E+03	8.9
036	C1E-2-C	2.1E+03		
048	C1E-3	1.5E+03	1.6E+03	9.5
049	C1E-3-C	1.7E+03		
061	C1E-4	4.8E+03	3.6E+03	63.4
062	C1E-4-C	2.5E+03		
074	C1E-5	8.8E+03	1.0E+04	28.7
075	C1E-5-C	1.2E+04		
089	C1E-6	2.7E+03	3.0E+03	17.3
090	C1E-6-C	3.3E+03		
104	C1E-7	NA	NA	NA
105	C1E-7-C	1.7E+03		
117	C1E-8	Det	Det	Det
118	C1E-8-C	Det		
132	C1E-9	4.1E+02	4.0E+02	5.0
133	C1E-9-C	3.9E+02		
145	C1E-10	<MDL	<MDL	<MDL
146	C1E-10-C	<MDL		

AVE= 20.5