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Report on Pesticide Air Monitoring Around a Field Application of Propanil In Colusa County during June 2008

Prepared by

Steve Rider, Air Pollution Specialist
Special Purpose Monitoring Section
Air Quality Surveillance Branch
Monitoring and Laboratory Division

July 22, 2009

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Monitoring Report Approval

Report Title: Report on Pesticide Air Monitoring Around a Field Application of Propanil in Colusa County during June 2008

Project Lead: Steve Rider, Air Pollution Specialist

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

Signatures:

_____ _____

Mac McDougall, Manager Date
Special Purpose Monitoring Section

_____ _____

Kenneth R. Stroud, Chief Date
Air Quality Surveillance Branch

Executive Summary

Report on Pesticide Air Monitoring Around a Field Application of Propanil In Colusa County during June 2008

At the request of the Department of Pesticide Regulation (DPR), the Air Resources Board (ARB) conducted air monitoring for the herbicide 3',4' - Dichloropropionanilide during the application of Super Wham Propanil Flowable Herbicide (common trade name: Propanil) in Colusa County from June 21 through June 24, 2008. This herbicide is used for post-emergence control of broadleaf and grass weeds in rice fields and its U.S. Environmental Protection Agency Registration number is 71085-5. Sampling was performed around a 134-acre field of rice during a Propanil application at the rate of 4.1 pounds of active ingredient (a.i.) per acre. Propanil was also applied, despite the farmer's and applicator's assurances that no other propanil application would occur within 0.5 miles, to the northern half of the field just south of the monitored field right after the monitored application. The application rate was 6.0 pounds of a.i. per acre.

A total of ninety six air samples along with fourteen quality control (QC) samples were collected by staff of the Air Quality Surveillance Branch. One (1) sampler was located on each side of the field and at each corner. Samples were collected on quartz fiber filters with an air sampling flow rate of three (3) LPM. An additional collocated sampler was installed adjacent to the southeast corner (SEC) site. The Scientific Review Panel of Toxic Air Contaminants requested additional samplers to verify collection efficiency of XAD resin sorbent tubes for trapping particulate matter. Three samplers had either an XAD resin sorbent tube before the filter or the XAD came after a filter. The sampled quartz filter air samples were analyzed using gas chromatography/mass selective detector by ARB's Northern Laboratory Branch in Sacramento. The XAD-4 resin sorbent tubes were analyzed using gas chromatography/mass spectrometry by the California Department of Food and Agriculture's Environmental Monitoring Laboratory.

<u>Propanil filter results</u>: The reported Propanil results from seventy-six air samples indicated ambient concentrations ranging from 0.014 ug/m^3 (during the background period) to a maximum of 55.9 ug/m^3 (during the application period). During the application, the south side samplers were directly hit by chemical spray, the most likely reason for the highest results during the study. Among sites that may not have been sprayed the highest was 30.4 ug/m^3 at the east side during the application period.

<u>Propanil, filter first followed by an XAD tube, results</u>: Reported Propanil results from sixteen XAD air samples ranged from a majority of non-detects to a maximum of 0.024 ug/m^3 during the application period. The percent breakthrough for the XAD samples which had detectable values, filter first followed by an XAD tube, ranged from 0.1% to 3.7%.

<u>Propanil, XAD tube first followed by a filter, results</u>: Reported Propanil results for the two XAD tubes indicated ambient concentrations ranging from 1.154 ug/m^3 to a maximum of 20.7 ug/m^3 during the application period. The percent breakthrough for the XAD samples, XAD tube first followed by a filter, were 2.6% and 54.6%.

Quality control field samples included 7 collocated pairs, 4 field spikes, 1 trip spike, 1 trip blank and 1 field blank. The Relative Percent Difference (RPD) of the collocated pairs for Propanil ranged from -0.8% to +33.0% with an average of 14.3%. The average field spike recovery was 81%. The trip spike recovery was 97%. The values recovered from the trip and field blank

were both 0.079 ug/sample. The Limit of Detection (LOD) for this study was 0.019 ug/sample and the Estimated Quantitative Level (EQL) was 0.096 ug/sample.

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1.0 Introduction

At the request of the California Department of Pesticide Regulation (DPR) (January 4, 2008 Memorandum, Warmerdam to Goldstene), the Air Resources Board (ARB) staff conducted air monitoring for the herbicide 3',4' - Dichloropropionanilide (common trade name: Propanil). Super Wham, with it's main ingredient being Propanil, was the herbicide used during this study. Propanil is used for post-emergence control of broadleaf and grass weeds in rice fields.

Ninety six air samples and fourteen quality control (QC) samples were collected at eight sites around a rice field in southeastern Colusa County. The southeast corner (SEC) site included a collocated sampler within two meters of the primary sampler. To address the Scientific Review Panel of Toxic Air Contaminants (SRP) questions about sample recovery with XAD sorbent resin tubes for trapping particulate matter, the SEC and northwest corner (NWC) sites had one each additional sampler installed with an XAD resin sorbent tube placed after the filter. The SEC site also had another sampler where the XAD resin sorbent tube was placed before the filter. Monitoring was performed during the period of June 21 -24, 2008. This monitoring was performed under the requirements of AB 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 that may be determined to pose a present or potential hazard...", when requested by the DPR. The "Sampling Protocol for Propanil Application Study" dated June 16, 2008, is located in Appendix A. Application information is listed in Table 1 (Application Information) and application sampling periods are listed in Table 2 (Application Sampling Periods).

2.0 Deviations From Protocol

Propanil applications in California limit aircraft applications to no more than 720 acres applied per day per county and the wind velocities must not exceed 7 miles per hour (MPH). Butte County's "2008 Non-Emulsifiable Propanil Permit Conditions" is located in Appendix A. DPR requested that no other application of the sampled pesticide was to be applied within ½ mile of the monitored field until the study is complete. This request was emailed and verbally communicated to the farmer and the County Agricultural (Ag) employees who helped locate the rice field to monitor. ARB was unaware of any other applications in the area until staff went to observe the applicator's post 4.1 a.i. per acre application activities. At that time the pilot notified ARB staff that they were applying to the adjacent field just to the south of the monitored field. The county's daily limit of 720 acres would have been exceeded if they sprayed the entire south field so they sprayed just the northern ½ of the field at the highest rate of 6.0 a.i. per acre. The farmer stated the day after the application that, "It was hoped that this higher rate would produce some weed kill in the part of the field that could not be sprayed".

3.0 Sampling Sites

The site nomenclature for this study was generated by identifying each site with respect to its position around the field related to true north.

A Mini-Vol sampler was placed approximately midway on each side of the field located between 46 to 65 feet from the edge of the crop. Four Mini-Vol sampler sites were placed diagonally from each corner at 58 to 90 feet from the edge of the crop. The placement of each sampler was dictated by variations in distances from the edge of the crop, access and available space. A collocated Mini-Vol sampler was placed adjacent to the SEC site (the projected downwind site). The SEC and NWC sites had one each additional DC pump sampler installed with an XAD resin sorbent tube placed after the filter. The SEC site also had another DC pump sampler where the XAD resin sorbent tube was placed before the filter. All samplers were setup to sample at three liters per minute (lpm). Mini-Vol samplers are used by ARB because of their reliable flows provided by Airmetric's constant flow control system. However, they would not pull the air through both the quartz filters and the XAD-4 resin sorbent tubes due to the pressure drop so ARB used DC powered pumps and controlled the flow with needle valves.

Exact placement and details are given in Table 3 (Sampler Waypoints) and can be seen located on the topographical map, aerial photos and sketch, Figures 1-4. Also see Appendix B for site photographs and the pesticide label.

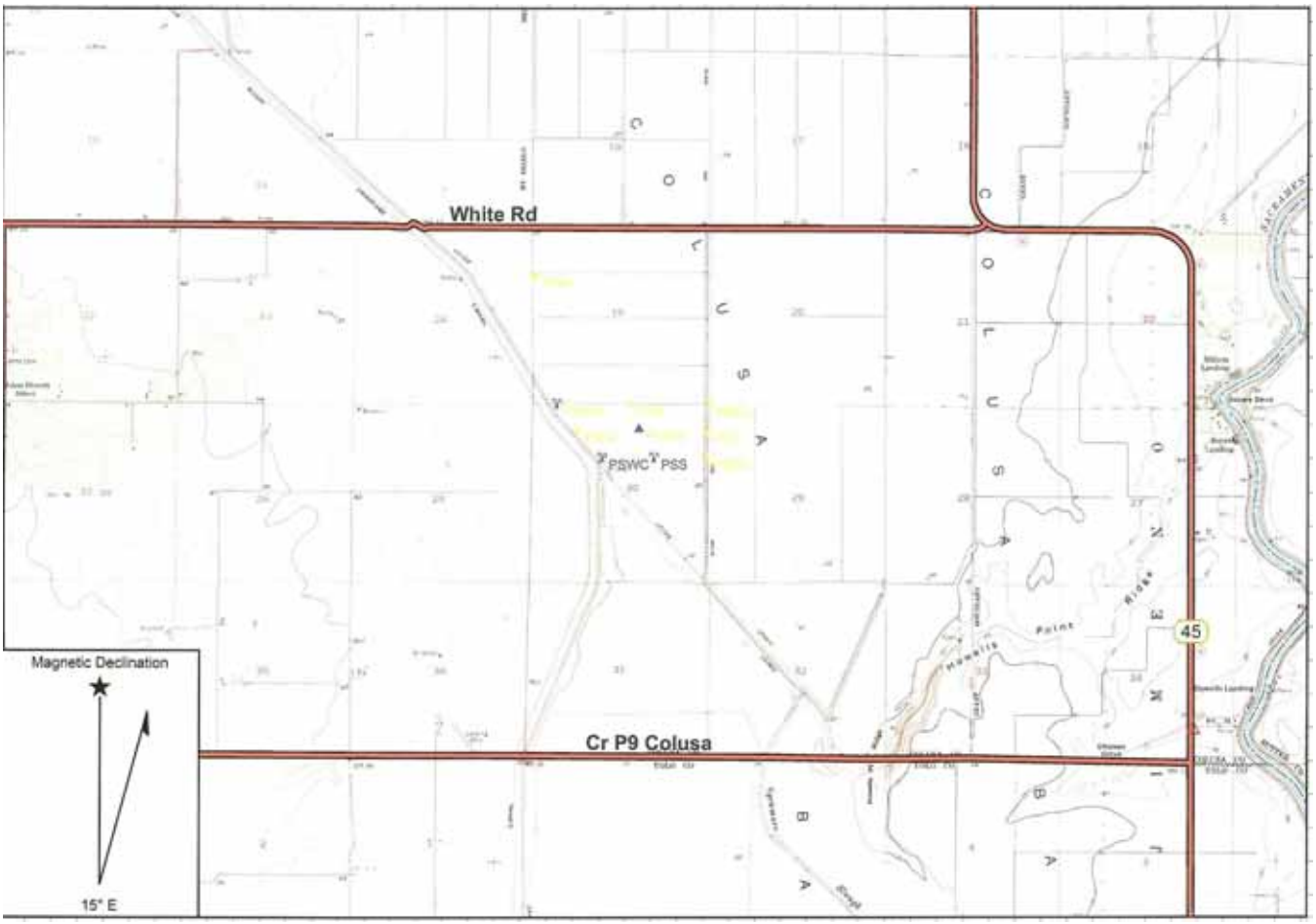

FIGURE 1: DUNNIGAN TOPOGRAPHICAL OVERVIEW OF MONITORED AREA

FIGURE 2: AERIAL PHOTO OVERVIEW OF MONITORED AREA

FIGURE 3: AERIAL PHOTO CLOSEUP OF MONITORED AREA

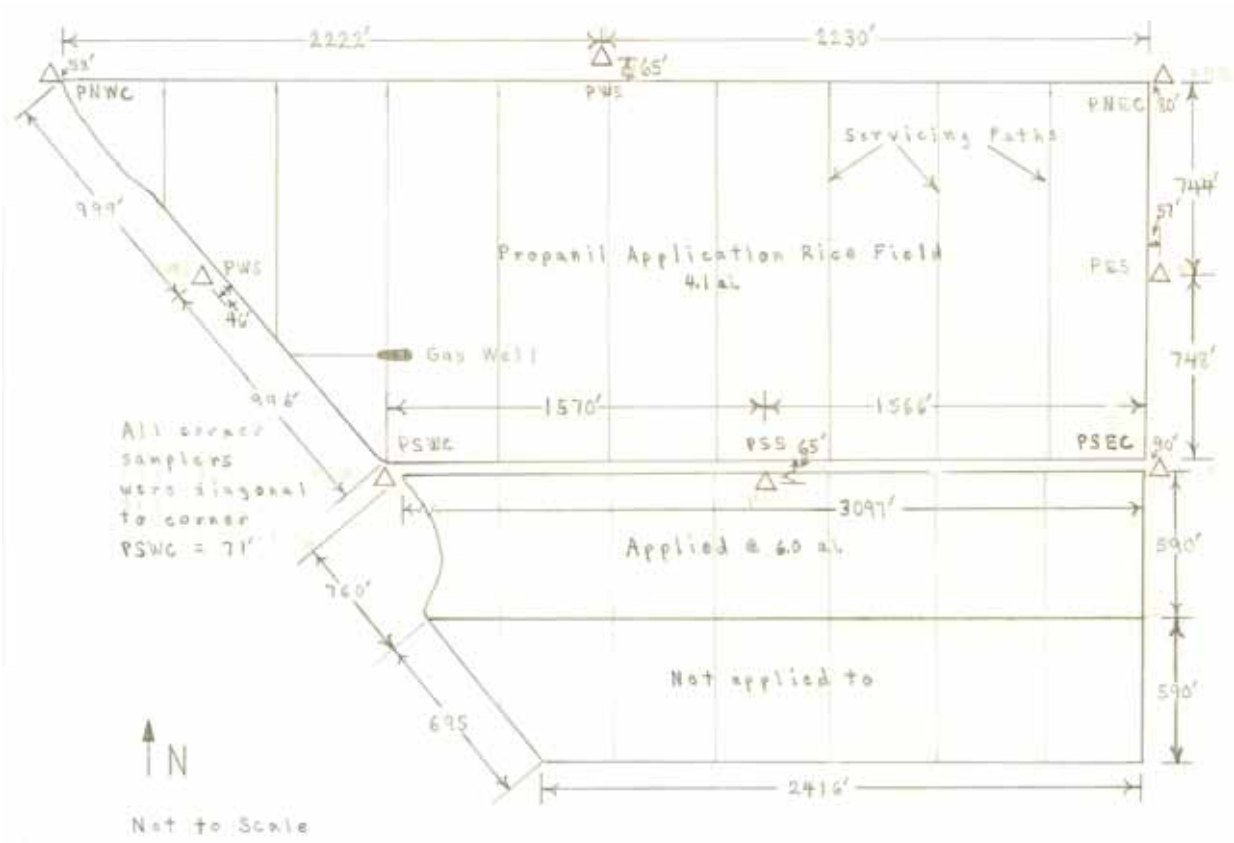

FIGURE 4: FIELD SKETCH

TABLE 1: APPLICATION INFORMATION

Parameter	Detail
Location	CA, Colusa County, Northeast of Dunnigan, South of White Road
R/T/S	1E/13N/30S Mt. Diablo
Field size	134 acres + top half of adjoining 75 acre field to south
Product applied	SuperWham! Herbicide, 41.2% 3',4' -Dichloropropionanilide (Propanil) & 58.8% inert ingredients
Application Type	Aerial spray (airplane), 134 acres: Start = 0539, End = 0658 + top half of 75 acres: Start = 0712, End = 0800
Commodity	Established Rice plants
Application rate	134 acres: 4.1 gallons per acre at a calculated a.i. of 4.1. Top half of 75 acres: 6.0 gallons per acre at a calculated a.i. of 6.0

TABLE 2: APPLICATION SAMPLING PERIODS

Sampling Period	Sampling Period Duration (Hours)	Month & Year (June 2008)	Time (Start/Stop)
Background (19.8 Hours)	18.83	20 - 21	0930 to 0510
1 (Application)	4.33	21	0525 to 0945
2 (Daytime)	10.08	21	0910 to1915
3 (Nighttime)	12.67	21 - 22	1810 to 0650
4 (Daytime)	12.63	22	0600 to 1850
5 (Nighttime)	12.80	22 - 23	1805 to 0630
6 (Daytime)	13.08	23	0540 to 1845
7 (Nighttime)	11.83	23 - 24	1810 to 0600

Note: Time (Start/Stop) overlaps are due to time getting around field of 14 to 64 minutes and each sample's sampling time will be less than this tables Sampling Period Duration due to different start and stop times.

TABLE 3: SAMPLER WAYPOINTS

Sampler ID	Sampler Position Related to Monitored Field	Waypoints
PMET (Meteorology Station)	3,858' north northwest of PNWC, Elevation = 25'	N 38° 57' 54.36" W 121° 54' 45.02"
PNWC (Northwest Corner)	58' diagonally northwest of the northwest corner, Elevation = 25'	N 38° 57' 16.16" W 121° 54' 36.42"
PWS (West Side)	46' west of west side and approximately midway along west side of field (999' N by 996' S), Elevation = 30'	N 38° 57' 08.31" W 121° 54' 28.66"
PSWC (Southwest Corner)	71' diagonally southwest of southwest corner, Elevation = 30'	N 38° 57' 00.17" W 121° 54' 19.25"
PSS (South Side)	65' south of south side approximately midway along south side of field (1570' W by 1566' E), Elevation = 24'	N 38° 57' 00.13" W 121° 53' 59.29"
PSEC (Southeast Corner), Collocated	90' diagonally southeast of southeast corner, Elevation = 30'	N 38° 57' 00.28" W 121° 53' 38.70"
PES (East Side)	57' east of east side and midway along east side of field (744' N by 748' S), Elevation = 30'	N 38° 57' 08.01" W 121° 53' 38.69"
PNEC (Northeast Corner)	80' diagonally northeast of northeast corner, Elevation = 30'	N 38° 57' 15.89" W 121° 53' 38.47"
PNS (North Side)	65' north of north side and approximately midway along north side of field (2222' W by 2230' E), Elevation = 24'	N 38° 57' 16.49" W 121° 54' 07.89"

4.0 Methods

A total of one hundred and ten air samples were collected from June 20th through June 24th. Fourteen quality control (QC) quartz fiber filter samples consisted of four (4) field spikes sampled during the background period, one (1) trip spike, one (1) trip blank, one (1) field blank and seven (7) collocated samples collected after the background at one each per sampling period. Seventy eight filter samples were collected consisting of four (4) background, fifty-six application/post-application filters, sixteen filters followed by an XAD resin sorbent tube and two (2) filters with XAD resin sorbent tubes prior to these filters. Eighteen samples were XAD-4 adsorbent resin tubes consisting of sixteen which were preceded by a filter and two (2) with the filter after the XAD tube.

Background sampling was performed from 0930 on June 20th through 0408 on June 21st for an 18.8 hour background period. Background samples included four (4) samples and four (4) field spikes placed near the center of each side of the field. The east and west sides included one (1) each sampler where a quartz fiber filter was placed in-line before the XAD resin sorbent tube.

The total application sampling period ran from 0525 through 0945 on June 21. The 4.1 a.i. per acre field application occurred from 0539 through 0658 and the 6.0 a.i. per acre field application occurred from 0712 through 0800. Due to safety concerns ARB staff waited one (1) hour after the end of the 6.0 a.i. per acre application before recovering samples. A post-application sampling period followed until one (1) hour before sunset. ARB then proceeded with three (3)

nighttime and two (2) daytime sampling periods which were completed by 0600 on the 24th of June.

There were two different sampling systems used. The main system consisted of a 37 mm quartz fiber filter held in a 47 mm filter cassette. The cassette was then placed inside the filter holder which was preceded by a rain cap. The flow was controlled by a battery powered Airmetrics Mini-Vol sampler with an automated constant flow control circuit. A secondary system was required due to the increased pressure drop of additional sampling media. The secondary system consisted of a battery powered DC pump which pulled ambient air through either a filter followed by an XAD resin sorbent tube or an XAD resin sorbent tube followed by a filter. Teflon 3/16" ID tubing connected the sampling media to the pump. All inlets were placed at 67" ±2" above the ground. The sample flow rate was set to three (3) lpm as measured using calibrated transfer standard mass flow meters (MFM). Sample flow measurements were taken at the beginning and end of each sample collection period.

For details of the monitoring method, please refer to Appendix A, "Sampling Protocol for Propanil Application Study" dated June 16, 2008.

Upon completion of sample collection, filter samples were transported to the MLD laboratory in Sacramento by ARB staff and XAD resin sorbent tubes were transported to ARB's Sacramento facility. DPR staff picked up and transported the XAD's to the California Department of Food and Agriculture's Environmental Monitoring Laboratory.

Collected filter samples were analyzed using the laboratory method titled, "Standard Operating Procedure for Sampling and Analysis of 3,4-Dichloropropionanilide (Propanil) in Ambient and Application Air using Gas Chromatography/Mass Selective Detector", located in Appendix A as part of, "Sampling Protocol for Propanil Application Study". Appendix C contains the laboratory results report titled, "3,4-Dichloropropionanilide (Propanil) Method Development and Analytical Results for Application Air Monitoring Samples in Colusa County" (October 20, 2008).

Collected XAD resin sorbent tube samples were analyzed by the California Department of Food and Agriculture's Environmental Monitoring Laboratory using the laboratory method of gas chromatography/mass spectrometry. The results are located in Appendix C following the ARB laboratory results.

5.0 Results

Propanil sample filter results are presented in Table 4. Results for samples where a filter preceded the XAD tube can be located in Table 5 (Propanil Application Filter/XAD Monitoring Results) and results for samples where the XAD preceded the filter can be located in Table 6 (Propanil Application XAD/Filter Monitoring Results). These analytical results were obtained from laboratory results located in Appendix C.

As mentioned in Section 3.0: Sampling Sites, the site nomenclature for this study was based upon the location of each site. Additional letters were added, after inserting a dash to identify the type of sample collected (background, collocated, blank or spike).

Examples:

ES-P-B = East Side - Propanil – Background
NWC-P-1 = Northwest Corner – Propanil – Sampling Period 1 (Application)
SEC-P-2C = Southeast Corner – Propanil – Sampling Period 2 Collocated
NS-P-FS#1 = North Side – Propanil – Field Spike #1
TB-1 = Trip Blank - #1

Table 4: Propanil Application Filter Monitoring Results

Site Name	Log #	Sample Name	Sampler ID #	Elapsed Time (Hours)	Avg. Flow (LPM)	Total Volume (m^3)	Date Analyzed	Propanil ug/sample	Propanil ug/m^3
East Side	003	ES-P-B	2251	17.80	4.31	4.606	6/25/08	0.070	0.015
East Side	**016**	**ES-P-1**	**2251**	**3.90**	**3.08**	**0.721**	**6/26/08**	**21.9**	**30.4**
East Side	**039**	**ES-P-2**	**2251**	**9.20**	**3.16**	**1.746**	**6/27/08**	**2.36**	**1.35**
East Side	049	ES-P-3	2251	11.70	2.99	2.098	7/1/08	0.910	0.434
East Side	062	ES-P-4	2251	12.10	2.95	2.138	7/1/08	1.22	0.57
East Side	075	ES-P-5	2251	11.60	2.99	2.080	7/2/08	0.397	0.191
East Side	088	ES-P-6	2251	12.30	2.95	2.178	7/7/08	0.943	0.433
East Side	101	ES-P-7	2251	11.40	2.94	2.011	7/8/08	0.269	0.134
North Side	001	NS-P-B	2265	17.50	4.31	4.522	6/25/08	0.067	0.015
North Side	**014**	**NS-P-1**	**2265**	**4.10**	**2.96**	**0.727**	**6/26/08**	**9.10**	**12.51**
North Side	**040**	**NS-P-2**	**2265**	**8.90**	**3.17**	**1.692**	**6/27/08**	**1.87**	**1.10**
North Side	047	NS-P-3	2265	11.70	3.00	2.106	7/1/08	0.405	0.192
North Side	060	NS-P-4	2265	12.10	2.97	2.158	7/1/08	0.803	0.372
North Side	073	NS-P-5	2265	11.50	3.00	2.070	7/2/08	0.547	0.264
North Side	086	NS-P-6	2265	12.50	2.97	2.229	7/7/08	0.817	0.367
North Side	099	NS-P-7	2265	11.40	2.99	2.044	7/8/08	0.360	0.176
Northeast Corner	015	NEC-P-1	2253	3.70	2.94	INVALID	N.A.	N.A.	N.A.
Northeast Corner	038	NEC-P-2	2253	9.30	3.16	1.762	6/27/08	1.20	0.68
Northeast Corner	048	NEC-P-3	2253	11.80	2.98	2.108	7/1/08	0.345	0.164
Northeast Corner	061	NEC-P-4	2253	12.00	2.95	2.121	7/1/08	0.390	0.184
Northeast Corner	074	NEC-P-5	2253	11.60	3.00	2.088	7/2/08	0.169	0.081
Northeast Corner	087	NEC-P-6	2253	12.40	2.92	2.175	7/7/08	0.274	0.126
Northeast Corner	100	NEC-P-7	2253	11.30	3.00	2.034	7/8/08	0.150	0.074
Northwest Corner	**026**	**NWC-P-1**	**956**	**3.95**	**3.07**	**0.728**	**6/26/08**	**2.80**	**3.85**
Northwest Corner	041	NWC-P-2	956	8.50	3.15	1.605	6/27/08	0.665	0.414
Northwest Corner	044	NWC-P-3	2252	11.80	3.14	2.220	7/1/08	0.177	0.080
Northwest Corner	057	NWC-P-4	2252	12.10	2.98	2.162	7/1/08	0.301	0.139
Northwest Corner	070	NWC-P-5	2252	1.60	1.51	0.145	7/2/08	0.115	0.795
Northwest Corner	083	NWC-P-6	958	12.45	3.06	2.285	7/7/08	0.302	0.132
Northwest Corner	096	NWC-P-7	958	11.37	2.97	2.024	7/8/08	0.192	0.095
South Side	005	SS-P-B	917	17.57	4.25	4.483	6/25/08	0.076	0.017
South Side	**023**	**SS-P-1**	**917**	**4.09**	**2.93**	**0.719**	**6/26/08**	**40.2**	**55.9**
South Side	**035**	**SS-P-2**	**917**	**9.38**	**2.98**	**1.679**	**6/27/08**	**2.72**	**1.62**
South Side	054	SS-P-3	917	11.58	2.95	2.050	7/1/08	0.877	0.428
South Side	**067**	**SS-P-4**	**917**	**12.04**	**2.97**	**2.143**	**7/1/08**	**2.16**	**1.01**
South Side	080	SS-P-5	917	11.55	3.03	2.098	7/2/08	0.791	0.377
South Side	093	SS-P-6	917	12.29	3.00	2.212	7/7/08	1.897	0.858
South Side	106	SS-P-7	917	11.24	3.07	2.071	7/8/08	0.570	0.275
Southeast Corner	**017**	**SEC-P-1**	**2244**	**3.90**	**2.92**	**0.684**	**6/26/08**	**18.9**	**27.6**
Southeast Corner	**022**	**SEC-P-1C**	**998**	**3.89**	**3.05**	**0.712**	**6/26/08**	**19.5**	**27.4**
Southeast Corner	031	SEC-P-2	2244	9.30	2.93	1.637	6/27/08	1.41	0.86

Table 4: Propanil Application Filter Monitoring Results Continued

Southeast Corner	**032**	**SEC-P-2C**	**998**	**9.48**	**2.99**	**1.703**	**6/27/08**	**2.04**	**1.20**
Southeast Corner	050	SEC-P-3	2244	11.70	3.02	2.121	7/1/08	0.671	0.316
Southeast Corner	051	SEC-P-3C	998	11.59	2.95	2.052	7/1/08	0.665	0.324
Southeast Corner	063	SEC-P-4	2244	12.00	2.97	2.140	7/1/08	0.996	0.465
Southeast Corner	064	SEC-P-4C	998	12.05	3.02	2.184	7/1/08	1.12	0.51
Southeast Corner	076	SEC-P-5	2244	11.60	4.41	3.070	7/2/08	0.408	0.133
Southeast Corner	077	SEC-P-5C	998	11.63	2.99	2.086	7/2/08	0.298	0.143
Southeast Corner	089	SEC-P-6	2-0402	11.62	3.31	2.307	7/7/08	0.524	0.227
Southeast Corner	090	SEC-P-6C	998	12.30	3.05	2.250	7/7/08	0.644	0.286
Southeast Corner	102	SEC-P-7	957	11.30	3.03	2.052	7/8/08	0.173	0.084
Southeast Corner	103	SEC-P-7C	998	11.24	3.02	2.038	7/8/08	0.221	0.109
Southwest Corner	**024**	**SWC-P-1**	**2246**	**4.10**	**2.79**	**0.687**	**6/26/08**	**29.2**	**42.5**
Southwest Corner	**036**	**SWC-P-2**	**2246**	**9.40**	**3.01**	**1.695**	**6/27/08**	**1.81**	**1.07**
Southwest Corner	055	SWC-P-3	2246	11.60	3.06	2.129	7/1/08	0.750	0.352
Southwest Corner	068	SWC-P-4	2246	12.00	2.96	2.128	7/1/08	1.38	0.65
Southwest Corner	081	SWC-P-5	2246	11.70	3.06	2.148	7/2/08	0.503	0.234
Southwest Corner	094	SWC-P-6	2246	12.30	2.97	2.194	7/7/08	0.813	0.371
Southwest Corner	107	SWC-P-7	2246	11.20	3.08	2.070	7/8/08	0.440	0.212
West Side	007	WS-P-B	956	17.74	4.27	4.550	6/25/08	0.065	0.014
West Side	**025**	**WS-P-1**	**915**	**4.19**	**3.01**	**0.755**	**6/26/08**	**8.60**	**11.38**
West Side	037	WS-P-2	915	9.43	2.88	1.630	6/27/08	0.980	0.602
West Side	056	WS-P-3	915	11.57	3.03	2.105	7/1/08	0.272	0.129
West Side	069	WS-P-4	915	12.00	2.93	2.113	7/1/08	0.540	0.256
West Side	082	WS-P-5	915	11.62	3.01	2.095	7/2/08	0.300	0.143
West Side	095	WS-P-6	915	12.27	2.99	2.200	7/7/08	0.532	0.242
West Side	108	WS-P-7	915	11.20	3.00	2.016	7/8/08	0.198	0.098

Note: BOLDED = Analytical results ≥ EQL
SHADED = Analytical results are flagged for reasons explained in text following the tables

Table 5: Propanil Application Filter/XAD Monitoring Results

Site Name	Log #	Sample Name	Sampler ID #	Elapsed Time (Hours)	Avg. Flow (LPM)	Total Volume (m^3)	Date Analyzed	Propanil ug/sample	Propanil ug/m^3
East Side	011	ES-P-BF	4663	17.40	4.00	4.174	6/25/08	0.125	0.030
East Side	012	ES-P-BX	4663	17.40	4.00	4.174		ND	ND
West Side	**009**	**WS-P-BF**	**4649**	**17.80**	**4.69**	**5.012**	**6/25/08**	**0.128**	**0.026**
West Side	010	WS-P-BX	4649	17.80	4.69	5.012		ND	ND
Northwest Corner	027	NWC-P-1F	4649	4.10	3.02	0.742	6/26/08	2.50	3.37
Northwest Corner	028	NWC-P-1X	4649	4.10	3.02	0.742		ND	ND
Northwest Corner	**042**	**NWC-P-2F**	**4549**	**8.40**	**3.10**	**1.561**	**6/27/08**	**0.593**	**0.380**
Northwest Corner	**043**	**NWC-P-2X**	**4649**	**8.40**	**3.10**	**1.561**		**0.017**	**0.011**
Northwest Corner	**045**	**NWC-P-3F**	**4649**	**11.80**	**2.99**	**2.120**	**7/1/08**	**0.182**	**0.086**
Northwest Corner	046	NWC-P-3X	4649	11.80	2.99	2.120		ND	ND
Northwest Corner	**058**	**NWC-P-4F**	**4649**	**12.00**	**2.96**	**2.128**	**7/1/08**	**0.344**	**0.162**
Northwest Corner	059	NWC-P-4X	4649	12.00	2.96	2.128		ND	ND
Northwest Corner	**071**	**NWC-P-5F**	**4649**	**11.30**	**2.80**	**1.901**	**7/2/08**	**0.251**	**0.132**
Northwest Corner	072	NWC-P-5X	4649	11.30	2.80	1.901		ND	ND
Northwest Corner	**084**	**NWC-P-6F**	**4649**	**12.40**	**2.96**	**2.203**	**7/7/08**	**0.337**	**0.153**
Northwest Corner	085	NWC-P-6X	4649	12.40	2.96	2.203		ND	ND

Table 5: Propanil Application Filter/XAD Monitoring Results Continued

Northwest Corner	**097**	**NWC-P-7F**	**4649**	**11.40**	**2.98**	**2.041**	**7/8/08**	**0.190**	**0.093**
Northwest Corner	098	NWC-P-7X	4649	11.40	2.98	2.041		ND	ND
Southeast Corner	018	SEC-P-1F	4663	4.00	2.97	0.713	6/26/08	15.8	22.1
Southeast Corner	**019**	**SEC-P-1X**	**4663**	**4.00**	**2.97**	**0.713**		**0.017**	**0.024**
Southeast Corner	**033**	**SEC-P-2F**	**4663**	**9.30**	**2.91**	**1.622**	**6/27/08**	**1.40**	**0.864**
Southeast Corner	**034**	**SEC-P-2X**	**4663**	**9.30**	**2.91**	**1.622**		**0.015**	**0.009**
Southeast Corner	**052**	**SEC-P-3F**	**4663**	**11.60**	**3.02**	**2.099**	**7/1/08**	**0.622**	**0.297**
Southeast Corner	**053**	**SEC-P-3X**	**4663**	**11.60**	**3.02**	**2.099**		**0.024**	**0.011**
Southeast Corner	**065**	**SEC-P-4F**	**4663**	**12.00**	**2.80**	**2.015**	**7/1/08**	**0.754**	**0.374**
Southeast Corner	066	SEC-P-4X	4663	12.00	2.80	2.015		ND	ND
Southeast Corner	**078**	**SEC-P-5F**	**4645**	**11.55**	**2.88**	**1.996**	**7/2/08**	**0.253**	**0.127**
Southeast Corner	079	SEC-5-5X	4645	11.55	2.88	1.996		ND	ND
Southeast Corner	091	SEC-P-6F	4664	4.60	1.51	0.417	7/7/08	0.230	0.552
Southeast Corner	092	SEC-P-6X	4664	4.60	1.51	0.417		ND	ND
Southeast Corner	**104**	**SEC-P-7F**	**4664**	**11.20**	**2.98**	**2.005**	**7/8/08**	**0.164**	**0.082**
Southeast Corner	105	SEC-P-7X	4664	11.20	2.98	2.005		ND	ND

Note: BOLDED = Analytical results ≥ EQL
SHADED = Analytical results are flagged for reasons explained in text following the tables

Table 6: Propanil Application XAD/Filter Monitoring Results

Site Name	Log #	Sample Name	Sampler ID #	Elapsed Time (Hours)	Avg. Flow (LPM)	Total Volume (m^3)	Date Analyzed	Propanil ug/sample	Propanil ug/m^3
Southeast Corner	020	SEC-P-1X(R)	4656	3.69	2.99	0.663		13.7	20.7
Southeast Corner	**021**	**SEC-P-1F(R)**	**4656**	**3.69**	**2.99**	**0.663**	**6/26/08**	**0.370**	**0.558**
Southeast Corner	029	SEC-P-2F(R)	4656	9.40	3.01	1.698	6/27/08	2.35	1.39
Southeast Corner	030	SEC-P-2X(R)	4656	9.40	3.01	1.698		1.96	1.15

Note: BOLDED = Analytical results ≥ EQL
SHADED = Analytical results are flagged for reasons explained in text following the tables

Data completeness for this study was 96% of the one hundred and ten samples collected. There were five (5) invalid samples. Log #015 was due to no filter being installed, #070, 091 & 092 were due to battery failures and #076 was due to the Mini-Vol flow controller failing causing final flow to be 5.8 lpm or 93% higher than the start flow of 3.0 lpm.

The laboratory's analytical results reported background levels of propanil from 0.014 to 0.017 ug/m^3 for the four sides around the 134 acre field. This was approximately four (4) times the Limit of Detection (LOD). Of the nineteen samples that exceeded the EQL of 1.0 ug/m^3, all but one (1) occurred during the application and post application sampling period. There was little correlation with the wind direction and the highest results. See Appendix D for wind roses and meteorological data. Overspray and drift were the most significant factors on the sites with the highest results. It was observed that the plane started and stopped spraying very close to the East sampler. The South sampler was sprayed while the 6.0 a.i. per acre field application occurred and most likely the Southwest and Southeast samplers were impacted by overspray. This appears to explain why these three (3) sites along with the East site have the highest results. The South sampler was physically cleaned off after the application period to prevent contamination during handing. It was noted that the Southeast, South and Southwest samplers showed elevated results during sampling period four (4). This was due to the farmer running new water through the 6.0 a.i. per acre field to dilute the higher application rate. The higher application rate potentially could damage the rice plants if left too long. After the application and post application sampling periods the drop off in

results were very rapid and the only result exceeding 1.0 ug/m^3 was the 1.01 ug/m^3 at the South sampler during sampling period four (4).

Results for the filter first followed by XAD samples showed breakthrough, through filter on to XAD, ranging from 0.1% to 3.7%. Results for the XAD first followed by a filter displayed higher breakthrough, through XAD on to filter, of 2.6% and 54.6%. Breakthrough was calculated as follows; breakthrough = second media value divided by the sum of second media value plus the first media value and all times 100.

Further reference material can be found in Appendix E which presents the field log sheets and Appendix F which presents the calibration/certification reports.

6.0 Quality Control Results

Quality control samples collected from the field consisted of seven (7) collocated filters, four (4) field spike filters, one (1) trip spike filter, one (1) field blank filter and one (1) trip blank filter. The quality control results are summarized below in Table 7 (Propanil Application QC Monitoring Results) and Table 8 (Propanil Application QC Field Spike Results).

The seven collocated samples average Relative Percent Difference (RPD) (a-b ÷ [(a+b) ÷ 2] x 100 = RPD) was 14% as reported in Appendix C (Laboratory Results). The average field spikes recovery was 96%, the trip spike recovery was 97% and the trip and field blank results were both 0.079 ug/sample. The blank's results were verified against the laboratories raw data and there is no obvious explanation for these results.

Table 7: Propanil Application QC Monitoring Results

Trip & Laboratory Spike Results								
Log Number	Sample Identification	Sampler ID #	Date Received	Date Analyzed	Expected (ug/sample)	Actual (ug/sample)	Recovery (%)	Sample (ug/m^3)
013	P-TS	N.A.	6/24/2008	6/25/2008	0.500	0.485	97.0%	N.A.
N.A.	LS	N.A.	N.A.	6/25/2008	0.500	0.466	93.2%	N.A.
Trip & Field Blank Results								
Log Number	Sample Identification	Sampler ID #	Date Received	Date Analyzed	MDL (ug/sample)	Blank (ug/sample)	Recovery (%)	Sample (ug/m^3)
109	TB-1	N.A.	6/24/2008	7/8/2008	0.019	0.079	N.A.	N.A.
110	FB-1	N.A.	6/24/2008	7/8/2008	0.019	0.079	N.A.	N.A.
Collocated Sample Results								
Log Number	Sample Identification	Sampler ID #	Date Received	Date Analyzed	Collocated (ug/sample)	Collocated (ug/m^3)	Sample (ug/m^3)	Relative % Difference
022	SEC-P-1C	998	6/24/2008	6/26/2008	19.5	27.4	27.6	-0.8%
032	SEC-P-2C	998	6/24/2008	6/27/2008	2.04	1.20	0.86	33.0%
051	**SEC-P-3C**	**998**	**6/24/2008**	**7/1/2008**	**0.665**	**0.324**	**0.316**	**2.5%**
064	**SEC-P-4C**	**998**	**6/24/2008**	**7/1/2008**	**1.12**	**0.51**	**0.47**	**9.8%**
077	**SEC-P-5C**	**998**	**6/24/2008**	**7/2/2008**	**0.298**	**0.143**	**0.133**	**7.2%**
090	**SEC-P-6C**	**998**	**6/24/2008**	**7/7/2008**	**0.644**	**0.286**	**0.227**	**22.9%**
103	**SEC-P-7C**	**998**	**6/24/2008**	**7/8/2008**	**0.221**	**0.109**	**0.084**	**25.5%**

Note: BOLDED = Analytical results ≥ EQL
SHADED = Analytical results are flagged for reasons explained in text following the tables

Field spike percent recoveries are shown on the next page in Table 8. Preceding the table is a brief description on the calculations necessary to determine the percent recovery of each field spike.

Field spike percent recoveries of 0.500 ug/sample field spikes are calculated as follows:

Field Spike Concentration (ug/m^3) = **Field Recovery** (ug/sample) / **Total Volume** of sampled ambient air (m^3).
Net Spike (ug/m^3) = **Field Spike Concentration** (ug/m^3) – **Primary Sample** (ug/m^3).
Net Spike (ug/sample) = **Net Spike** (ug/m^3) x **Total Volume** of sampled ambient air (m^3).
Spike Percent Recovery = **Net spike** (ug/sample) / **Lab Spike Value** (ug/sample) x 100%.

Table 8: Propanil Application QC Field Spike Results

Log #	Sample ID	Field Recovery (ug/sample)	Total Volume (m^3)	Field Spike Concentration (ug/m^3)	Primary Sample (ug/m^3)	Net Spike (ug/m^3)	Net Spike (ug/sample)	Lab Spike Value (ug/sample)	Spike Percent Recovery
001	NS-P-B	0.067	4.522	N.A.	0.015	N.A.	N.A.	N.A.	N.A.
002	NS-P-FS#1	0.453	4.693	0.097	N.A.	0.082	0.383	0.500	77%
003	ES-P-B	0.070	4.606	N.A.	0.015	N.A.	N.A.	N.A.	N.A.
004	ES-P-FS#2	0.457	4.597	0.099	N.A.	0.084	0.387	0.500	77%
005	SS-P-B	0.076	4.483	N.A.	0.017	N.A.	N.A.	N.A.	N.A.
006	SS-P-FS#3	0.488	4.629	0.105	N.A.	0.089	0.410	0.500	82%
007	WS-P-B	0.065	4.550	N.A.	0.014	N.A.	N.A.	N.A.	N.A.
008	WS-P-FS#4	0.528	4.611	0.114	N.A.	0.100	0.462	0.500	92%

Calculated values in the above table were produced from original laboratory data using six (6) decimal places.