Department of Pesticide Regulation

Mary-Ann Warmerdam
Director

M E M O R A N D U M

Arnold Schwarzenegger
Governor

TO: Susan Edmiston **HSM-06012**
Agriculture Program Supervisor IV (Pest Management)
Worker Health and Safety Branch

FROM: Nino Yanga *(original signed by N. Yanga)*
Associate Environmental Research Scientist
Worker Health and Safety Branch
(916) 445-4222

Bernie Hernandez *(original signed by B. Hernandez)*
Associate Environmental Research Scientist
Worker Health and Safety Branch
(916) 445-4222

DATE: December 18, 2006

SUBJECT: PROJECT 0605 (PRIORITY INVESTIGATION 25-SAC-06), POSSIBLE DRIFT - DISULFOTON

On September 21, 2006, the Worker Health and Safety (WHS) Branch was informed of a possible drift incident that occurred in several apple orchards from an application on nearby asparagus fields in Sacramento County. The pesticide product reportedly used was Di-Syston 8 Emulsifiable Systemic Insecticide (EPA Reg. No 3125-307), registered by Bayer Crop Science LP. The active ingredient, disulfoton (O,O-Diethyl S-[2-(ethylthio)ethyl]-phosphorodithioate, is an organophosphate insecticide. The incident occurred on the west side of Grand Island, Walnut Grove, southwest of River and Leary roads.

At around 12:00 noon, we arrived at the Sacramento County Agricultural Commissioner's (CAC) Walnut Grove office. Also present were Dave Wilson, Karen Vietheer, Adrian Ramos, Diana Acosta and Gerry Zepeta of the Sacramento CAC office and Eric Smith and Ken Everett of the Northern Regional Office of DPR's Enforcement Branch.

Karen Vietheer provided us with the information available to us at the time; refer to the map of Grand Island showing the treated asparagus fields in relation to the apple orchards (Attachment 1): Karen received a call at around 9:20 a.m. from Don Miller of DH&P Farms informing her of the incident. According to Mr. Miller, his workers started working around 6:30 a.m., picking apples and/or pruning trees in two fields. There were reportedly twenty-six workers in Field A2 and three in Field A7. Between 7:00 and 7:30 a.m., workers detected an odor and felt nauseated. According to initial reports, the three workers in Field A7 exhibited vomiting. Mr. Miller sent his workers home and told them to shower and put on clean clothes. After talking further with CAC staff, Mr. Miller sent his workers for medical evaluation.

At around the same time, Mr. Miller's neighbor, Daryl Ferrera, had about 13 workers picking apples in Field 5D47, which was adjacent to Field A7. One of these workers reportedly exhibited vomiting. Workers were allowed to resume work in this section at around 11:30 a.m.

Karen informed us that Alexander Ag Flying Services performed the application. The aerial application occurred at approximately 7 a.m. on asparagus fields owned by Joey Sanchez of Joe Sanchez Farms. The plane that applied the pesticide was traveling in a west to east direction before turning back and heading east.

At around 1:00 p.m., Adrian Ramos, a biologist from the Sacramento County CAC, took us to the approximate location of the fields. The fields were located off 13545 Grand Island Road in Walnut Grove. While attempting to locate someone who could direct us to the fields involved, Bernie talked to three workers leaving the orchards. They said that they had been working in Field 5D47 earlier and the odor from the application made them feel nauseated and caused them to have a slight headache. They left the area when they felt ill but returned after the odor had dissipated to continue working. They also commented that they did not experience any other symptoms and did not see any reason to seek additional medical attention. They assisted us in locating the fields involved in the incident. We were unable to get the names and contact information for these three workers.

We located a blueberry field to use as a reference point in identifying the fields the workers were in. We collected representative dislodgeable foliar residue (DFR) samples from the fields involved based on the size of the field, the number of rows in the field, the likely rows where there were workers (ladders present, disturbed foliage, etc.). See Attachment 2, page 5 for schematic and sample numbers. Each sample within the field was collected randomly from the trees nearest the asparagus field to the area where the workers were in the apples. We collected a total of 12 samples, four samples each from fields A7, 5D47 and A2. Each sample consisted of 40 one-inch apple leaf discs, collected with a Rabbit Tool, Inc., leaf punch. Each sample was collected into a four-ounce glass jar, which was capped with a Teflon-lined lid.

We did not detect any pesticide odor while in the fields. We observed ladders on the north side of Fields A2 and A7 and on the northwest corner of Field 5D47.

The samples were stored on ice in an insulated cooler for transit to the analytical facility, the California Department of Food and Agriculture, Center for Analytical Chemistry (Lab). We drove the samples immediately thereafter to the Lab, and transferred sample custody at approximately 4:25 p.m. on September 21. On September 25, the Lab supervisor, Stephen Siegel, reported that all 12 DFR samples were none detected (ND) for disulfoton. On September 26, the Lab ran the extracts to evaluate residues of disulfoton sulfone, a breakdown product of disulfoton. Six samples showed trace levels of the sulfone: all four samples collected from Field A7, and one sample each from Field A2 and Field 5D47.

Sampling was conducted in accordance with HS-1600, Guidance for the Determination of Dislodgeable Foliar Residue and the following WHS standard operating procedures (SOPs):

- WHS-FO03, Dislodgeable Foliar Residue Sampling,
- FO04, Identification and Labeling of Samples
- FO05, Sample Tracking, Shipping and Receiving
- FO07, Records and Notebooks (Field Data), and
- FO08, Project Documentation and Numbering

We also took approximate measurement of the fields themselves – number of rows, approximate length and width, and the distance of the fields in relation to the treated asparagus fields (Attachment 2). We also noted the presence of 50 – 60 foot tall poplar trees bordering the fields. It is approximately ¼ mile from the edge of the nearest series of treated asparagus fields (M1, M2, M3 and M4) to the east side of Field A2. From the southwest tip of these asparagus fields, it is approximately ¼ mile to the northeast tip of Field A7 and approximately ½ mile to the northeast section of Field 5D47. Rows of poplar trees bordered the north and west side of Field A7. The same row of trees bordering the west side of Field A7 also bordered the east side of Field 5D47. Field A2 had a row of trees on its east and south side (Attachment 2). We observed gaps of up to 20-30 feet in the row of poplars bordering the northern edge of Field A7 and the eastern edge of Field 5D4.

Workers were seen at Methodist Hospital, located at 7500 Hospital Drive, Sacramento, CA 95823. CAC and Methodist Hospital staff consulted with Janet Spencer, WHS and Dr. Michael O'Malley, medical consultant for WHS, regarding the type and number of clothing and biological samples that would be meaningful in this investigation. It was reported to WHS that upon being interviewed at the hospital, several workers reported that they had felt nauseated, had smelled a strong odor, and had developed headaches. In addition, none of the workers reported having felt any spray mist and none reported having vomited. Based on this information, WHS advised that biological samples would likely be useful for documentation purposes only.

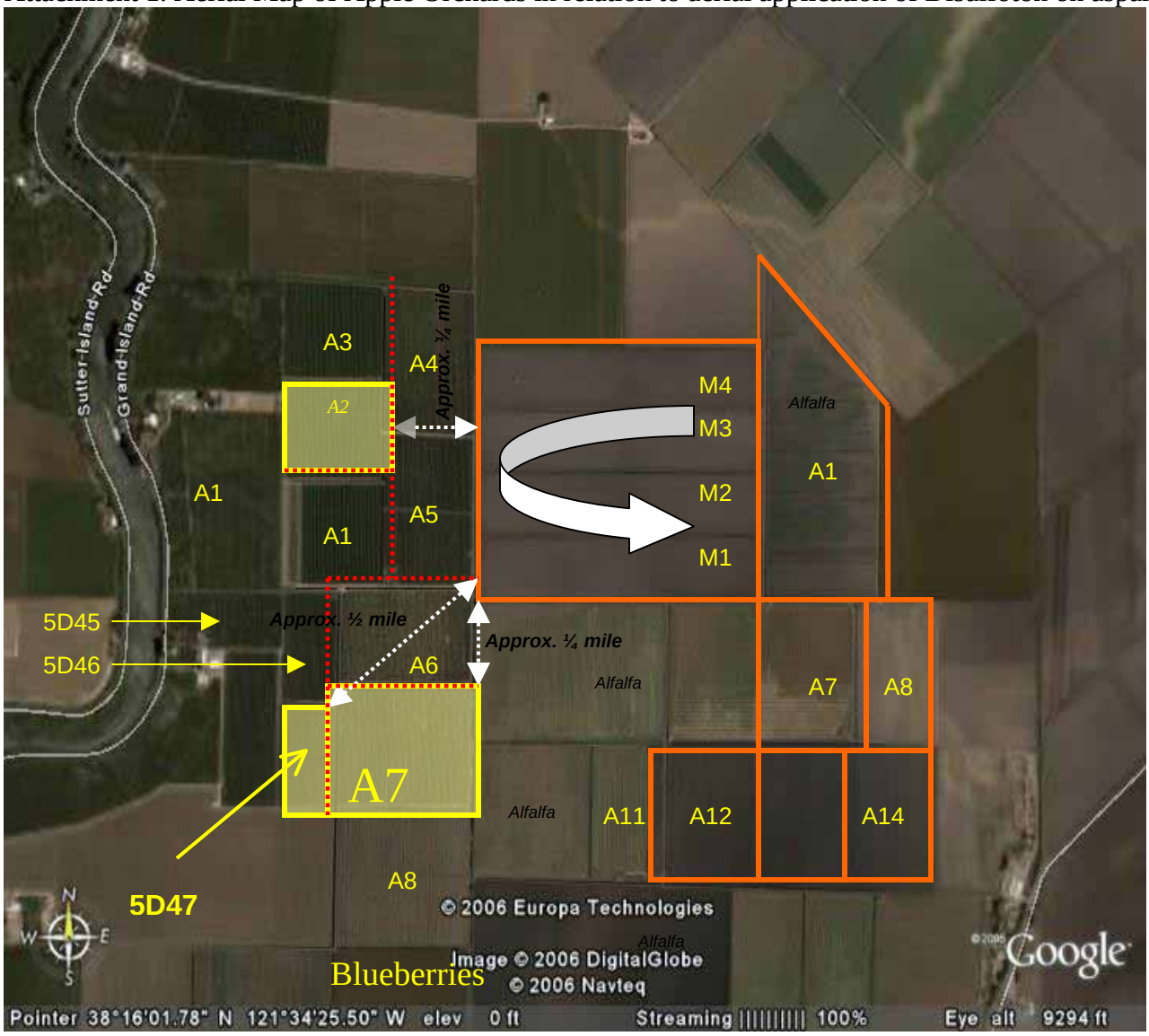
Exposure to organophosphate (OPs) insecticides can be assessed by the presence of one or more of six urinary alkyl phosphates at levels above population background levels. Each OP has a specific "fingerprint" of up to three diethyl or three dimethyl alkyl phosphates that would be anticipated to be present following exposure. Exposure to disulfoton would be anticipated to result in elevated urinary diethyl phosphate levels. WHS suggested that the four workers who experienced the most severe symptoms provide spot urine sample; these workers did submit urine samples. The samples were analyzed for both dimethyl and diethyl phosphates. Diethyl phosphates were below the detection limit in all four samples. However, dimethyl phosphates were detected in all four samples at levels comparable to or slightly above background levels.

This may indicate previous exposure to other OPs. Blood samples were not collected at Methodist Hospital, as it was considered unlikely that workers had experienced any cholinesterase inhibition. Dr. Ben Watson in Lodi saw one additional worker; Dr. Watson collected a blood sample for analysis of RBC cholinesterase. The results were reported to be within the normal range.

The CAC reported that the grower had collected some of the workers' clothing and that three or four shirts may be available on September 22 for chemical analyses. However, on September 22, Diana Acosta, of the Sacramento CAC, informed me that there was a misunderstanding regarding the clothing samples. The Fire Department had released the clothes to the workers after they had been decontaminated. Diana informed me that they were still trying to track down the workers to obtain the clothing samples.

cc: Janet Spencer, Senior Environmental Research Scientist
Eric Smith, Northern Regional Office, Enforcement Branch
Ken Everett, Northern Regional Office, Enforcement Branch
Juli Jensen, Sacramento CAC

Attachment 1. Aerial Map of Apple Orchards in relation to aerial application of Disulfoton on asparagus.



Legend:

Sections where disulfoton was applied on asparagus

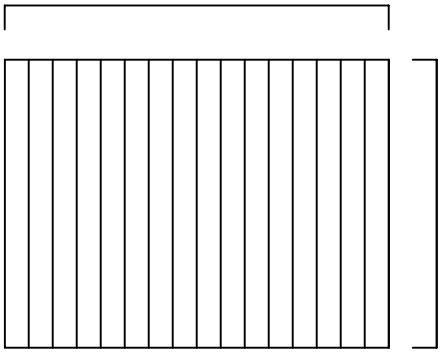
Fields where workers were working on Apple Orchards and where DFR samples were collected (Fields A2, A7 and 5D47)

Rows of Poplar trees, approximately 50 – 60 feet high

Direction of aerial application of disulfoton

Attachment 2. Schematic diagram of the approximate dimensions of apple orchards where workers were working and location where WH&S staff collected DFR samples on September 21, 2006. Drawings are not to scale.

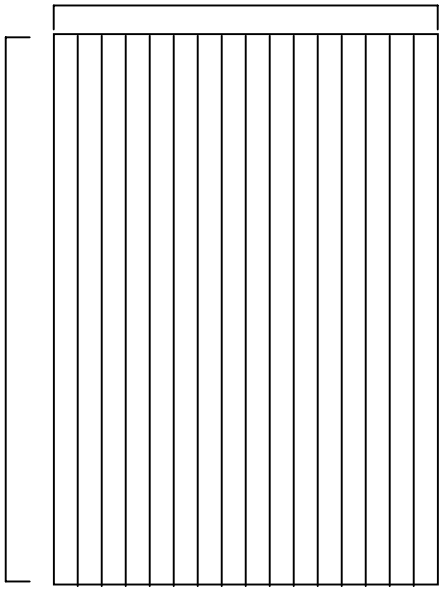
Field A7:
0.23 miles, 88 rows



0.19 miles

WH&S DFR Sample Numbers (Row)
0605-0001 (Row 10)
0605-0002 (Row 25)
0605-0003 (Row 40)
0605-0004 (Row 55)

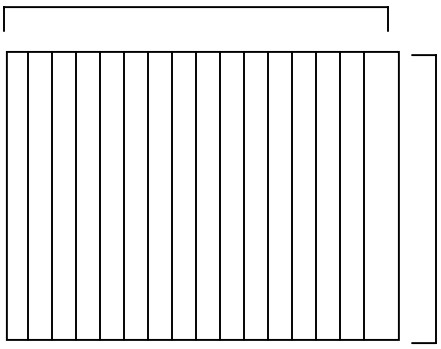
Field 5D47:
0.1 miles, 34 rows



0.17 miles

WH&S DFR Sample Numbers (Row)
0605-0005 (Row 3)
0605-0006 (Row 8)
0605-0007 (Row 16)
0605-0008 (Row 24)

Field A2:
0.17 miles, 57 rows



0.1 miles

WH&S DFR Sample Numbers (Row)
0605-0009 (Row 10)
0605-0010 (Row 20)
0601-0011 (Row 27)
0605-0012 (Row 37)