



Department of Pesticide Regulation



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MEMORANDUM

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TO: Sue Edmiston
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HSM-01016

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DATE: October 31, 2001

SUBJECT: WH&S BRANCH ACTIVITIES AND RESULTS OF ANALYSES RELATED
TO THE INVESTIGATION OF PRIORITY ILLNESS EPISODE 45-TUL-00
(PROJECT 0002)

Incident Chronology

On July 17, 2000, at approximately 5:30 AM, a 28-member harvest crew working for a labor contractor began picking Valencia oranges in an untreated grove on Sprague Ranch. The property is located near the northwest corner of Avenue 216 and Road 204, in Tulare County. Twenty rows south of where the harvesters began work, a five-row portion of the grove had been treated the day before with Lorsban™-4E (EPA registration number 62719-220; 44.9% active ingredient chlorpyrifos) at the rate of 12 pt/acre. In 2000, Lorsban™-4E had a restricted entry interval of 2 days in oranges and applications were not required to be posted. At approximately 9:30 AM, the Sprague Ranch farm manager noticed that some of the crew were picking in the treated area and immediately informed the crew foreman to remove the workers from the field. The crew left the field by 10:00 AM. The workers had completed picking 26.75 bins in the treated rows.

The crew was instructed to go home, shower, change, launder their work clothing and picking bags, and go to the Morinda Medical Clinic, (the Clinic) located in Porterville, for observation and treatment, if needed. Seventeen workers subsequently sought treatment at the Clinic. Initially, all workers were asymptomatic. Since chlorpyrifos is an organophosphorus pesticide, the workers submitted blood samples for cholinesterase evaluation. Results for the six workers willing to sign medical releases were well within the normal reference range for both plasma and red blood cell cholinesterase.

The workers were released following examination and instructed to return for a follow-up exam in one week. During follow-up examinations on July 24, the workers all reported developing a slight headache after being released from the Clinic on July 17. The workers' headaches had resolved by July 24. The diagnosis for all workers was "pesticide exposure, resolved".



Incident Investigation

The Tulare County Agricultural Commissioner's office (CAC) and Worker Health and Safety Branch (WH&S) were informed of the incident about 2:00 PM by a manager with Sunkist. Since five or more workers sought medical treatment for symptoms associated with pesticide exposure, the incident met priority criteria for human effects and was assigned priority episode case number 45-TUL-00 (1).

On July 18, Tulare CAC staff collected a five-point composite Valencia orange foliage sample from the treated area and submitted it to the California Department of Food and Agriculture, Center for Analytical Chemistry (the Lab) for analysis of total chlorpyrifos residues. The Lab found 9.69 ppm chlorpyrifos in the sample.

Also on July 18, Janet Spencer, of WH&S, collected eight dislodgeable foliar residue (DFR) samples from the five treated rows. Each sample consisted of 40 1-inch discs (surface area of approximately 400 cm²). The harvesters had been working in the western half of the grove on July 17. Five samples, one from each row, were collected from trees where workers were harvesting, and included both harvested and unharvested trees. One sample was collected from trees throughout the five-row area. Two samples were collected from the eastern half of the grove, where no workers had entered. The results, provided in Table 1, indicate similar levels of chlorpyrifos in both harvested and non-harvested areas of the five treated rows.

Table 1. Dislodgeable Foliar Residue (DFR) Results for Chlorpyrifos Residues on Valencia Oranges, Collected July 18, 2000 in Investigation of Priority Episode 45-TUL-00

Sample Location ^a	µg/cm ² chlorpyrifos	Mean ± Standard Deviation
Row 1, W	0.030	Worker Contact Area 0.026 + 0.006 µg/cm ²
Row 2, W	0.023	
Row 3, W	0.018	
Row 4, W	0.023	
Row 5, W	0.027	
Rows 1- 5, W	0.036	
Rows 3 – 5, E	0.028	No Worker Contact
Rows 1 – 3, E	0.023	0.025 + 0.003 µg/cm ²
All samples		0.026 + 0.005 µg/cm ²

a W = western half of the five-row area, where harvesters were working, samples collected from both harvested and unharvested trees.
 E = eastern half, no worker entry

Studies observing worker exposure to chlorpyrifos during the harvesting of tree fruits are not available. Consequently, in estimating worker exposure for these tasks, WH&S used transfer factors from surrogate studies for similar work activities combined with a DFR value for the chlorpyrifos residues at the time of exposure to estimate dermal exposure (2). However, transfer factors provide reliable estimates of exposure only for DFR values above $0.1 \mu\text{g}/\text{cm}^2$. Because the DFR values in this investigation are below $0.1 \mu\text{g}/\text{cm}^2$, the data are unsuitable for use in such extrapolations and worker exposure cannot be estimated.

After the samples were collected, Megan Bloodworth, of DPR's Central Regional Office (CRO), met with Strathmore Packing and put a hold on the 26.75 bins of Valencias that were harvested from the treated rows. The bins were labeled and placed in a sweat room for the 35-day period required by the pre-harvest interval (PHI) for LorsbanTM-4E. Following expiration of the PHI, the oranges were tested and found to contain 0.14 ppm chlorpyrifos. Since this was well below the tolerance of 1.0 ppm, the oranges were released for processing on August 22.

Summary and Violations

Seventeen members of a 28-member crew of harvesters worked approximately 30 minutes in a grove treated 24 hours previously with LorsbanTM-4E. When the ranch manager noticed they were working in the treated area, he ordered the workers be removed from the field, decontaminate themselves, and seek medical treatment. All 17 workers who sought medical treatment developed headaches associated with their exposure. All symptoms had resolved by a week after the exposures. The workers told Tulare CAC staff that they did not smell any pesticide odor while harvesting in the treated rows. The workers who did not seek medical treatment either refused to be interviewed or stated they never entered the treated rows.

The ranch manager acted appropriately in removing the workers from the treated grove and in instructing them to decontaminate and seek medical treatment. Prompt action on his part likely prevented the workers from developing more serious illnesses. However, the incident would not have happened if the crew had been notified of the LorsbanTM-4E application as required in Title 3, California Code of Regulations (3 CCR), section 6618(b) (3). The Tulare CAC issued two Violation Notices to the pesticide permit applicant for Sprague Ranch, both related to the use of LorsbanTM-4E. One was for violating 3 CCR 6618(b). The second was for use in conflict with labeling, a violation of California Food and Agriculture Code section 12973 (4). The latter violation was for an applicator failing to wear required personal protective gear, which the CAC inspector noted during a concurrent safety inspection.

Since residues were sampled at the approximate expiration of the REI, these results will also be incorporated into Project 9505, the Day of Reentry study.

References

1. DPR and US EPA (2001) Cooperative Agreement Between the State of California Department of Pesticide Regulation, California Agricultural Commissioners and Sealers Association, and the United States Environmental Protection Agency, Region IX. California Department of Pesticide Regulation, Pesticide Enforcement Branch, 1001 I Street, Sacramento, California, 95814
2. Thongsinthusak, T., et al. (1993) HS-1661, Estimation of Exposure of Persons in California to Pesticide Products that Contain Chlorpyrifos. California Department of Pesticide Regulation, Worker Health and Safety Branch, 1001 I Street, Sacramento, California 95814
3. California Department of Pesticide Regulation (1998) Title 3, Division 6, California Code of Regulations. California Department of Pesticide Regulation, 1001 I Street, Sacramento, California 95814
4. California Food and Agriculture Code, Office of Administrative Law, available on their web site at: <http://www.oal.ca.gov> (accessed October 31, 2001)