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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
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MEMORANDUM

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

SUBJECT: Human Health Risks for Chlorpyrifos.  
Tox PN #1311; Caswell #219AA.

TO: Mike McDavit (61)  
Special Review Branch  
Registration Division (TS-767)

FROM: Stephen Saunders, Ph.D.  
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*Saunders*  
*4/7/86*

THRU: Laurence D. Chitlik, DABT  
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TOX/HED (TS-769C)  
and  
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*LDC*  
*4/9/86*

*Thompson*  
*4/10/86*

Action Requested

Review the PIMS data to provide an assessment of human health risks to chlorpyrifos.

Recommendation

A sufficient amount of information is presented in the PIMS data, as well as the reported incident from Region 8, to suggest that chlorpyrifos can present a significant hazard to human health under some use conditions.

Discussion

The available data were reviewed in order to provide a subjective assessment of the potential risks that can result from the use of chlorpyrifos formulations. This review will focus only on those incidents in which chlorpyrifos was the only insecticide implicated, or was contained in a termiticide formulation, or was of sufficient gravity as to merit attention. Incidents such as accidental spills in which exposure to a variety of agents occurred, and accidental ingestions, will not be discussed.

Data were provided from the state of California concerning the number of hospital days that resulted from exposures to chlorpyrifos. This chemical caused a total of 34 days of hospitalization between the years 1980 and 1985, which was sixth on the submitted list. Only diazinon (41), mevinphos (49), malathion (56), parathion (66) and methyl bromide (191) caused more days of hospitalization in California. A tabulation of pesticides reported by California physicians to cause systemic poisoning

(prepared by Jerome Blondell), also placed chlorpyrifos as the sixth-leading cause of poisoning in that state, accounting for 2.9% of all cases. Expressed as poisonings per 1,000 pounds sold, chlorpyrifos was fourth on the list of top 10 pesticides causing systemic poisoning.

The PIMS tabulation indicated that of the 421 incidents reported between 1966 and 1981, 129 were the result of exposure to chlorpyrifos alone. Since this monitoring information is essentially anecdotal, no attempt has been made to quantitate the incidents, or compile statistics similar to those provided by California. Only the most significant incidents, and representative examples of other types of incident, in which chlorpyrifos exposure as a result of application was clearly implicated, will be discussed. Incidents with a (\*\*) were considered to be especially noteworthy due to the seriousness of the illness.

**Report #67400010 (4/20/74):** After application of a termiticide preparation containing chlorpyrifos and chlordane (concentrations unspecified), a woman reportedly became "mildly ill" after entering her residence. The report did not specify symptoms, nor whether any medical treatment was initiated.

**\*\*Report #67500151 (5/3/74):** During application of chlorpyrifos (2 oz/gal) to carpeting by a PCO, a 1-1/2 year old infant was accidentally dermally exposed. The infant died the next day. At autopsy, findings of pulmonary edema were reported, and a diagnosis of organophosphate intoxication was made.

**Report #97601249 (1/8/76):** A worker was dermally exposed after he fell while applying chlorpyrifos. Symptoms included nausea and muscle weakness.

**Report #76700145 (7/26/76):** A sixteen year-old female was dermally exposed when she was "drenched" with chlorpyrifos E.C. (22.4%) by a PCO who was hand-treating a tree nearby. Symptoms included headaches and blurred vision. The teenager was hospitalized, however treatment and sequelae were not disclosed.

**Report #87780246 (7/11/77):** After treatment of their apartment by certified PCOs in the morning, a couple who returned home in the evening reported tightness of the chest, dizziness, and listlessness. After ventilation of the residence, no further complaints were reported.

**Report #47850559 (4/4/78):** The galley of an airplane was heavily treated with a mixture of chlorpyrifos and dichlorvos, and residues of insecticide were visible. Two stewardesses were exposed by inhalation, and were briefly hospitalized with complaints of nausea, cramps, weakness and dizziness.

**Report #47922092 (7/31/79):** A PCO was admitted to the hospital with complaints of headache, nausea and "tingling" of the extremities following dermal exposure to chlorpyrifos and/or toxaphene. Laboratory tests indicated "inhibited" cholinesterase activity.

**\*\*Report #98008371 (1/80):** A family brought a new-born infant home to their residence, which had been treated three days previously by a "pest control firm". The infant became progressively more ill over the next several days, and was admitted to the hospital in apparently critical condition. His symptoms included cyanosis, respiratory arrest, limpness, unresponsiveness, and pinpoint pupils. The infants difficulties were complicated by an apparent mis-diagnosis of his condition, however he reportedly responded "promptly" to treatment with atropine, the standard treatment for organophosphate intoxication. The family residence reportedly "smelled strongly" of insecticide, however it was not clear that a misapplication was involved.

**\*\*Report #68015869 (4/29/80):** A residence was treated by "exterminators" with a mixture of chlorpyrifos and dichlorvos. The bedroom of a 3-month-old child was not treated, and the infant was removed from the residence for seven hours after treatment. The infant's bedroom was apparently poorly ventilated. Over the next 4 days, the infant developed symptoms of runny nose, diarrhea, weakness and lethargy. The child was admitted to the hospital in apparently poor condition, with symptoms of respiratory depression, stupor, excess secretions, pneumonia and bradycardia. The infant reportedly responded well to treatment with atropine and pralidoxime, standard treatments for organophosphate intoxication.

**Report from Region 8:** A woman's house was apparently treated with chlorpyrifos for termites. In attempting to treat between floors, chlorpyrifos apparently was directly applied to carpeting on one of the floors. The woman was instructed by the applicator to mop up the spill with a towel. After attempting to clean the spill, the woman became ill. She was admitted to the hospital, and a diagnosis of mild organophosphate poisoning was made. Her medical records of this incident have been made available to the Agency by her physician.

### Conclusion

The available data clearly suggest that after exposure of sufficient magnitude, chlorpyrifos can present a significant hazard to human health. It is of some interest to note that the most significant reports involved inadvertent exposures to infants, which suggests that infants may be particularly susceptible to chlorpyrifos toxicity.