

## Biotech Systems June 24, 2009

Late last week, the Chemical Hazards Program (CHP) received a copy of a Letter of Violation from the Georgia Structural Pest Control Commission (SPCC) that was issued to Biotech Systems of Georgia (Biotech Systems). Biotech Systems has apparently made improper applications of pesticides in nursing homes and other health care facilities throughout Georgia. Furthermore, some of the technicians working for Biotech Systems of Georgia have not been registered in the State of Georgia to apply pesticides. SPCC has asked CHP to look at the potential health hazards of three pesticides used by Biotech Systems in Georgia.

The SPCC is concerned about the application of following pesticides:

- Termidor
- ZP Tracking Powder
- Demon WP

### TERMIDOR

TERMIDOR was introduced in the United States in 2000 as a non-repellant or "undetectable" liquid termite treatment. Unlike older insecticides, non-repellents can not be smelled, tasted, or even felt by pests. So they crawl through the treated area, unaware that ingesting treated materials or merely contacting the insecticide will cause them to die. This same non-repellent, undetectable technology has also proven highly effective in controlling many species of nuisance ants and other household pests. TERMIDOR was designed to be applied outside to the exterior foundation walls of a house, creating a treated area of protection.

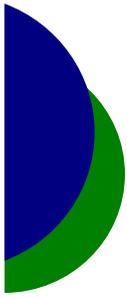
Fipronil is the active ingredient in TERMIDOR, which is commonly used by pest control operators for protection of residential and commercial buildings in Georgia. Fipronil is also found in a variety of insecticide products used for protection of crops (REGENT), seed treatments (ICON), control of ants (OVER n' OUT) and roaches (MAXFORCE) around the home and lawn; and control of fleas and ticks on pets (FRONTLINE). Fipronil kills insects through both contact and ingestion. Fipronil works by blocking the gamma-aminobutyric acid (GABA) receptor system that is responsible for preventing excessive stimulation of nerves. By blocking this system,

fipronil results in uncontrolled central nervous system activity and subsequent death of the insect. The GABA channel is found in both vertebrates (e.g., humans, fish, and wildlife) and invertebrates (e.g., insects); however, fipronil's effects are markedly more pronounced in invertebrates because it binds more tightly to their GABA receptors.

When applied outdoors, fipronil is not volatile so there is little likelihood of humans being exposed to this compound in the air. Fipronil tends to break down relatively quickly in sunlight; however, it is stable in water and has a half-life in soil of up to a year, favoring long-term control of termites in the soil. Fipronil is not highly water soluble and it tightly adsorbs to soil, characteristics which reduce the opportunity for leaching to ground water and runoff to surface waters. However, the indoor application of TERMIDOR may not breakdown as rapidly as outdoors application because of its water-insolubility and lack of ultraviolet radiation indoors.

Fipronil is considered moderately toxic when administered orally or by inhalation, but is practically non-toxic when exposure occurs via the skin (for example, cats and dogs can be treated by direct dermal application of fipronil flea control products). Symptoms of high-dose exposure may include excitability, lack of coordination and tremors. Fipronil is considered slightly irritating to the skin, while moderately irritating to the eyes. There is no evidence suggesting that fipronil may cause birth defects. Following high dose exposures, fipronil was associated with delayed development and mild reproductive toxicity in laboratory animals.

The World Health Organization (WHO) considers fipronil to be moderately hazardous. The WHO bases its ratings on the lowest published rat oral LD<sub>50</sub>, the lethal dose (in milligrams of substance per kilogram of body weight) that kills 50% of the test animals in a standard assay. Adverse health effects from acute exposure to moderately hazardous solids can begin at ingestion rates of 50 to 500 mg/kg of body weight. Extrapolating to humans, a typical 70 kg person might exhibit symptoms of toxicity if that person acutely ingested 3,500 to 35,000 mg (3.5 to 35 grams) of fipronil.



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**Environmental Health Branch**  
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More specifically, the Material Safety Data Sheet (MSDS) for Termidor (which contains 9.1% fipronil) states that this compound has an oral LD<sub>50</sub> of 1999 mg/kg (rats), a dermal (skin contact) LD<sub>50</sub> of 2000 mg/kg (rats), and an inhalation LC<sub>50</sub> (one hour exposure) of 6.8 mg/liter of air. These are equivalent to a 70 kg person ingesting approximately 140 grams of zinc phosphide, having skin contact with 140 grams of this product, or breathing 6.8 mg/ liter of air (or 6,800 mg per cubic meter of air).

Based on the mammalian toxicity information on fipronil and limited exposures, use of this compound to control this arboreal termite is not likely to introduce acute health risks to human populations. Fipronil does not pose a known cancer risk to humans.

#### **ZP Tacking Powder**

ZP Tracking Powder is a rodenticide tracking powder intended for use in location inaccessible to children and pets, where it is not going to come in contact with food, not disturbed by foot traffic, and not disturbed by significant air movement, such as near forced air vents. It is used to bait mice in home, industrial and agricultural buildings and other man-made structures.

ZP Tracking Powder is an acute, single-dose rodenticide containing the active ingredient, 10% Zinc Phosphide. Ingested when the mouse grooms, ZP Tracking Powder liberates toxic phosphine gas on contact with dilute acids present in the stomach, killing the mouse in a matter of hours.

During application of this product, precautions must be taken by handlers, including loaders and handlers, must wear long-sleeved shirts, long pants, shoes plus socks, chemical resistant gloves, and a NIOSH approved particulate-filter respirator and protective eyewear.

The MSDS for ZP Tracking Powder states that this compound has an oral LD<sub>50</sub> of 275 mg/kg (rats), a dermal (skin contact) LD<sub>50</sub> of 2000 mg/kg (rats), and an inhalation LC<sub>50</sub> of 19.6 mg/liter of air. These are equivalent to a 70 kg person ingesting 19.25 grams of zinc phosphide, having skin contact with 140 grams of this product, or breathing 19.6 mg/ liter of air (or 19,600 mg per cubic meter of air).

Because the ZP Tracking Powder was applied to kitchen and pantry areas of nursing homes and other health facilities, human exposure is likely to occur through skin contact, inhalation of small amounts, and by ingestion of small amounts from hand-to-mouth activities. It is unlikely however, that person living in these facilities would be acutely exposed to levels producing an LD<sub>50</sub> in rats. I could not find any toxicity data on chronic exposure to zinc phosphide.

#### **Demon WP**

Demon WP is an insecticide that is designed for crack and crevice and/or spot applications for residual and contact control of Ants, Carpenter Ants, Cockroaches, Crickets, Spiders and many other insect pests. Its active ingredient is 40% Cypermethrin. Cypermethrin is a synthetic compound primarily used as an insecticide and present in many household ant and cockroach killers. It acts as a fast-acting neurotoxin in insects that is easily degraded on soil and plants but can be effective for weeks when applied to inert, indoor surfaces. Exposure to sunlight, water and oxygen will accelerate its decomposition.

People exposed to Cypermethrin from handling it can experience tingling, burning, dizziness, and itching. The MSDS for Demon WP states that this compound has an oral LD<sub>50</sub> of 1,800 mg/kg (rats), a dermal (skin contact) LD<sub>50</sub> of 2000 mg/kg (rabbits), and an inhalation is not available. These are equivalent to a 70 kg person ingesting 126 grams of Demon WP, and having skin contact with 140 grams of this product. Chronic toxicity studies have found a No Observed Adverse Effects Level (NOAEL) when dogs were exposed to 5 mg/kg/day over a two year period and when rats were exposed to 7.5 mg/kg/day over a two year period. Two separate 2-year feeding studies revealed no evidence of carcinogenicity that could be attributable to Cypermethrin.