

**SCREENING-LEVEL ASSESSMENT OF THE POTENTIAL HEALTH
IMPACTS FROM TERMITICIDE APPLICATION TO THE RESIDENCE OF
MURRAY THOMPSON, BLIGH PARK, NSW, AUSTRALIA**

SUMMARY

Biflex[®] is a termiticide formulation that is used on existing residential and commercial structures in Australia. Biflex[®] contains bifenthrin, a synthetic pyrethroid chemical, at a level of 100 g per liter of formulation. Biflex[®] also contains a liquid hydrocarbon solvent in the formulation. The single-level slab residence of Mr. Murray Thompson was treated with Biflex[®] for termite control on December 7, 2000. Spray application of Biflex[®] to a wooden perimeter fence also occurred on December 7, 2000, and again on February 21, 2001. These applications were conducted at the direction of the Department of Housing (DOH), State of New South Wales, Australia. Almost immediately after termiticide application, Mr. Thompson is reported to have developed classic central nervous system (CNS) symptoms of hydrocarbon solvent toxicity, which include headache, dizziness, fatigue, and decreased coordination. For a number of years after the treatment, Mr. Thompson continued to react to hydrocarbon solvents inside his residence.

An examination of the application bore holes revealed that application was made very close to the residence, often as little as 6.5 cm away from the wall of the residence. Recent excavations near the residence revealed the presence of a shallow subterranean concrete ledge of irregular width running around the perimeter of the residence and extending out from the residence beyond the distance of known bore holes. This is thought to be excess concrete that was “dumped” near the foundation during construction of the unit. Biflex[®] that was injected into the soil around the residence by an applicator would likely have pooled on the shallow underground ledge, followed by absorption into the porous concrete, rather than diffusing into the soil below. This would have created a long-term reservoir of Biflex[®] (including the active ingredient and hydrocarbon solvent) at a shallow depth involving concrete saturated with the solution. Given the proximity of this contaminated concrete to the residence and the poor condition of the exterior of the residence (including brickwork and edges of the slab), vapors of volatile chemicals in the applied Biflex[®] could have entered Mr. Thompson’s residence over a period of years.

In order to determine whether the exposures Mr. Thompson received to Biflex[®] could have reasonably caused his symptoms, an exposure reconstruction study was conducted by risksciences, LLC. As part of this effort, (1) emission rates were calculated for 3 vapor-entry pathways, including vapor intrusion through the slab, soil diffusion to outdoor air near windows, and entry from contaminated concrete into the wall structure of the residence; (2) the levels of hydrocarbon solvent in the indoor air of Mr. Thompson’s unit at various points in time were determined using an approved U.S. Environmental Protection Agency indoor air model known as the Multi-Chamber Concentration and Exposure Model (MCCEM); and (3) the estimated exposures were compared to applicable health-based standards and guidelines.

Based on the reconstructed indoor air levels of aliphatic hydrocarbon solvents associated with application of the termiticide Biflex[®] to Mr. Thompson's residence, inadequate margins-of-safety (MOSs) for solvent-related CNS effects existed for at least the summer season for years 2001 through 2004. The reconstructed airborne concentrations of hydrocarbon solvents are very similar to those measured in a previous monitoring study performed in Mr. Thompson's residence. The exposure period in the first few weeks immediately after application of the termiticide Biflex[®] was not modeled. However, based on experience and the available scientific literature, it would be anticipated that airborne levels of solvent vapors would have spiked at much higher levels within 24 to 48 hours after application. Based on this assessment, it was concluded that the treatment of Mr. Thompson's residence with the termiticide Biflex[®] is consistent with, and was the most likely reason for, his CNS-related symptoms during the exposure period.

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