1,3-DICHLOROPROPENE: RISK MANAGEMENT

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Over the past several years, use of 1,3-dichloropropene (1,3-D) has come under increased regulatory scrutiny. The U.S. Environmental Protection Agency initiated the reregistration and special review processes in 1986, and have recently notified the basic registrant, DowElanco, of their intent to terminate the special review process and conclude the reregistration process in 1997. In addition, other regulatory bodies have conducted extensive assessments on the effects of 1,3-D on human health and the environment (i.e. The World Health Organization - Environmental Health Criteria Document 146, and various risk assessments to allow continued use of 1,3-D in the State of California).

Resolution of product safety issues has required a comprehensive risk management approach that includes definition of benefits and potential risks associated with 1,3-D use, development of state-of-the-art risk refinement and management technologies, research to define effectiveness of potential risk mitigation, and exposure reduction measures through labeling modifications and enhanced product stewardship efforts. Identification of "real world" solutions that minimized 1,3-D loss to the atmosphere while being economically feasible for producers was essential.

Air concentration determinations were accomplished by in-depth emission characterizations utilizing several field volatility studies. 1,3-D flux was shown to vary as a function of soil moisture and temperature conditions, depth of injection, quality of soil sealing, application rates, time of day and number of days after application. Peak emissions occurred during late afternoon and early evening periods and a mass loss ranging from 11 to 26% of applied 1,3-D occurred 2 to 5 days following application. From these emission characterizations, a model could be developed using product use projections and historical weather data, and Monte Carlo analysis and then validated by actual measured air concentrations under commercial use conditions.

Exposure scenario analysis considered variables such as air concentrations, breathing rate, duration of exposure, lifetime and body weight. Coupled with an understanding of regional air concentration distributions, this analysis allowed the conduct of exposure assessment. Linking the exposure assessment with the appropriate toxicological endpoints, a meaningful understanding of lifetime risk could then be developed. Based upon Cal-EPA and U.S. EPA "Potency" assumptions and lifetime average daily exposures, potential risk can be summarized as 6×10^{-6} to 2×10^{-5}, 1×10^{-6} to 3×10^{-6}, 3×10^{-6} to 9×10^{-6} and less than 1×10^{-6} for product applicators, product loaders, field reentry workers and residential populations respectively.

Implemented risk reduction measures can be categorized according to the relevant U. S. populations. For residential populations: the maximum application depth was increased from 10 to 12 inches; enhanced soil sealing requirements were added to the product labels as well as further definition of soil moisture management practices; the minimum number of shanks per row were clarified and a definition of placement as no closer than 12 inches to the nearest soil/air interface added; and a 300 foot buffer zone to an occupied structure implemented, except for use on soils to be planted with perennial crops that will not experience additional 1,3-D treatment for at least three years, for example pineapple, perennial vines, hops, mint, fruit and nut trees. For worker populations: the requirement for respiratory protection for reentry workers and applicators was added; charcoal-filtered cabs are emphasized as an alternative to respiratory protection; and the reentry interval was extended from 3 to 5 days.

Enhancements to the product stewardship and training efforts were also implemented. In addition to product label improvements, application manuals, users guides and training videos were reworked, and a newsletter and safety check lists were developed for applications, safety, equipment and equipment

maintenance. All stewardship materials were updated and distributed to applicators, dealers and distributors in September 1996.