

Establishing Risk-Based Action Levels for Unique Exposure Scenarios in Response to Illegal Pesticide Applications

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EPA regulates pesticides so that there is no unreasonable risk when used according to the label directions. However, situations arise when pesticides are misused or illegally applied resulting in potential exposures that may threaten human health. In these situations, risk-based action levels must often be established to protect law enforcement, emergency response officials, and the public and from adverse health effects from exposure to pesticides. Illegal pesticide applications may present unique and challenging exposure scenarios where default exposure assumptions or generic health-based action levels are not applicable or useful. Therefore, site-specific action levels must be calculated for unique exposures scenarios by determining risk based upon site-specific exposure parameters and the chemical hazard. Two case studies will be presented to demonstrate how standard risk assessment methodology can be applied to determine risk and establish action levels that are protective of human health. In one scenario, a herd of 850 bison was potentially exposed to chlorophacinone, an anticoagulant rodenticide. Products that contain chlorophacinone are not registered for use near crops or where livestock may graze. Furthermore, a reference dose and a food tolerance have not been established for chlorophacinone. In response to this incident, a reference dose of 0.005 $\mu\text{g}/\text{kg}/\text{day}$ was calculated using standard uncertainty factors and a risk-based screening level of 0.2 $\mu\text{g}/\text{kg}$ was calculated using conservative exposure assumptions based upon reasonable maximum exposure for a subsistence population. Because the screening level is below analytical detection limits, residue levels in bison were modeled using worst case scenario exposure parameters. Based on the modeled residue levels and the half-life of diphacinone from a ruminant exposure study (Crowell et al. 2013), a hold time of 16 months for the potentially exposed bison was calculated to ensure that the risk-based screening levels were not exceeded. In another case, the application of the unregistered pesticide, Doom (76% active ingredient dichlorvos) in the Knights Inn, Michigan City, Indiana and the Super 8 Motel, Howe, Indiana posed risks of concern to motel guests and employees. Risk-based surface clean up levels for porous and nonporous surfaces were calculated using the EPA Integrated Risk Information (IRIS) reference dose and by estimating exposure from oral and dermal contact for both workers and motel guests. These case studies demonstrate how standard risk assessment principles can be applied to unique exposure scenarios to establish action levels that are protective of public health.