

TABLE 2.— SUMMARY OF TOXICOLOGICAL DOSE AND ENDPOINTS FOR ZINC PHOSPHIDE FOR USE IN HUMAN RISK ASSESSMENT

Exposure Scenario	Dose Used in Risk Assessment, UF	Study and Toxicological Effects
Acute dietary (general population including infants and children)	NOAEL = 2.0 mg/kg/day UF = 100 Acute RfD = 0.02 mg/kg/day	Developmental Toxicity Study-Rat LOAEL = 4.0 mg/kg/day based on maternal deaths on gestation day 10 (i.e., after 4 doses) though day 16
Chronic dietary (all populations)	NOAEL = 0.1 g/kg/day UF = 1,000 Chronic RfD = 0.0001 mg/kg/day	90-Day Oral Toxicity Study-Rats LOAEL = 1.0 mg/kg/day based on increased mortality, increased absolute and relative liver weight, and hematological alterations
Short-term dermal (1 to 7 days) Intermediate-term (1 week to several months) Long-term dermal (several months to lifetime) (Residential)	Not applicable	Dermal exposure is not expected since baits are not absorbable and Zn phosphide powder is too polar to be absorbed through the skin
Short-term inhalation (1 to 7 days) Intermediate-term inhalation (1 week to several months) Long-term inhalation (several months to lifetime) (Residential)	Not applicable	Inhalation exposure is not expected. End-use baits are not powdery or respirable
Cancer (oral, dermal, inhalation)	Not applicable	Not applicable

C. Exposure Assessment

1. *Dietary exposure from food and feed uses.* Tolerances have been established (40 CFR 180.284(a)) for residues of phosphine resulting from the use of zinc phosphide, in or on a variety of raw agricultural commodities including: Grape (0.01 ppm), grass (rangeland) (0.1 ppm), and sugarcane (0.01 ppm). Tolerances with regional registration are established 40 CFR 180.284(c) for zinc phosphide residues in or on globe artichokes (0.01 ppm), sugar beet (roots) (0.04 ppm), and sugar beet tops (0.02 ppm). Section 18 tolerances at 40 CFR 180.284(b) currently exist for zinc phosphide residues in or on: Alfalfa forage, alfalfa hay, barley grain, barley hay, barley straw, sugar beets (tops), sugar beet roots, timothy, hay, timothy, forage, potato, wheat grain, wheat hay, and wheat straw.

Based on residue data from field trials conducted in support of the subject tolerances, EPA concludes that acute and chronic dietary exposure associated with the proposed uses of zinc phosphide is unlikely. Residues were below the Level of Quantitation (LOQ) (<0.05 or <0.1 ppm) in crops, except for the livestock feed items alfalfa forage, sugar beet tops, and timothy forage. Alfalfa forage, sugar beet tops, and timothy hay are not direct human food items; rather, they are used as animal feeds. Because residues of zinc phosphide ingested by

livestock would be immediately converted to phosphine and metabolized to naturally occurring phosphorus compounds, residues of zinc phosphide in livestock feeds are not expected to result in residues of zinc phosphide in livestock commodities. Also, the act of processing and washing will not allow for unreacted zinc phosphide to remain in or on food items. In addition, residues are not expected in wheat and barley grain since zinc phosphide will be applied to barley and wheat prior to the formation of seed heads.

2. *Dietary exposure from drinking water.* No drinking water risk assessment was performed for zinc phosphide because no residues are expected in either ground water or surface water.

3. *From non-dietary exposure.* The term “residential exposure” is used in this document to refer to non-occupational, non-dietary exposure (e.g., for lawn and garden pest control, indoor pest control, termiticides, and flea and tick control on pets).

Zinc phosphide is currently registered in pellet and bait form for use on residential non-food sites to control mammals (primarily rodents) in areas such as commercial establishments, public areas (parks), dumps, and homes. A detailed residential exposure assessment is contained in the Reregistration Eligibility Decision (RED)

Document, EPA 738-R-98-006, July 1998, for zinc phosphide.

There were no endpoints identified for zinc phosphide use in a residential assessment except for accidental ingestion. The residential exposure assessment evaluated exposure from accidental ingestion of zinc phosphide. No other residential exposure assessment was either expected or, if expected, found to have any hazard potential.

Although having considered that accidental ingestion of zinc phosphide baits may occur with respect to a very small number of children, EPA has concluded that this potential exposure is not appropriate for inclusion in evaluating the safety of aggregate exposure of consumers and major identifiable subgroups of consumers to zinc phosphide. Unlike other residential uses (such as a turf use) that potentially may result in exposures to significant groups of children, the subgroup of children that may consume baits in childproof bait stations is very tiny. This small subgroup of children would not qualify as a major identifiable subgroup of consumers.

4. *Cumulative effects from substances with a common mechanism of toxicity.* Section 408(b)(2)(D)(v) of the FFDCA requires that, when considering whether to establish, modify, or revoke a tolerance, the Agency consider “available information” concerning the cumulative effects of a particular