

children exceed the modeled DWEC surface water residues. Therefore, there is reasonable certainty that no harm will result from cumulative and aggregate (food and water) exposure to cypermethrin and zeta-cypermethrin residues.

2. *Non-dietary exposure.* Zeta-cypermethrin is registered for agricultural crop applications only, therefore non-dietary exposure assessments are not warranted.

D. Cumulative Effects

In consideration of potential cumulative effects of cypermethrin and other substances that may have a common mechanism of toxicity, to our knowledge there are currently no available data or other reliable information indicating that any toxic effects produced by cypermethrin would be cumulative with those of other chemical compounds; thus only the potential risks of cypermethrin have been considered in this assessment of its aggregate exposure. FMC Corporation intends to submit information for EPA to consider concerning potential cumulative effects of cypermethrin consistent with the schedule established by EPA in the **Federal Register** of August 4, 1997 (62 FR 42020) (FRL-5734-6) and other EPA publications pursuant to the FQPA.

E. Safety Determination

1. *U.S. population.* The chronic RfD of 0.06 mg/kg/day for zeta-cypermethrin is based on a NOAEL of 6.0 mg/kg/day from a cypermethrin chronic feeding study in dogs and an UF of 100. The endpoint effect of concern was based on clinical signs. A chronic dietary exposure/risk assessment has been performed for zeta-cypermethrin using the above chronic RfD. Available information on anticipated residues, monitoring data and percent crop treated was incorporated into the analysis to estimate the ARC. The ARC is generally considered a more realistic estimate than an estimate based on tolerance level residues. The ARC is estimated to be 0.000184 mg/kg bwt/day and utilize 0.3% of the chronic RfD for the overall U.S. population. The ARC for non-nursing infants (<1-year) (subgroup most highly exposed) is estimated to be 0.000666 mg/kg bwt/day and utilizes 1.1% of the chronic RfD, respectively. The ARCs for children 1 to 6 years old and children 7 to 12 years old are estimated to be 0.000477 mg/kg bwt/day and 0.000254 mg/kg bwt/day and utilizes 0.8% and 0.4% of the chronic RfD, respectively. The ARC for females (13+/nursing) is estimated to be 0.000180 mg/kg bwt/day and utilizes

0.3% of the RfD. Generally speaking, EPA has no cause for concern if the total dietary exposure from residues for uses for which there are published and proposed tolerances is less than 100% of the chronic RfD. Therefore, FMC Corporation concludes that the chronic dietary risk of zeta-cypermethrin, as estimated by the dietary risk assessment, does not appear to be of concern.

Acute dietary exposure risk assessments are performed for a food-use pesticide if a toxicological study has indicated the possibility of an effect of concern occurring as a result of a 1-day or single exposure. For the purposes of assessing acute dietary risk for zeta-cypermethrin, FMC Corporation has used the NOAEL of 10.0 mg/kg/day from the zeta-cypermethrin acute neurotoxicity study in rats with an UF of 100 (acute RfD = 0.10 mg/kg/day). The LEL of 50.0 mg/kg/day was based on clinical signs. This acute dietary endpoint is used to determine acute dietary risks to all population subgroups. Available information on anticipated residues, monitoring data and percent crop treated was incorporated into a Tier 3 analysis, using Monte Carlo modeling for commodities that may be consumed in a single serving. These assessments show that the percent acute (percent PAD) all fall below EPA's level of concern ($\geq 100\%$). The 95th percentile of exposure for the overall U.S. population was estimated to be 0.001177 mg/kg/day (percent acute RfD of 1.2); 99th percentile 0.003307 mg/kg/day (percent acute RfD of 3.3); and 99.9th percentile 0.012692 mg/kg/day (percent acute RfD of 12.7). The 95th percentile of exposure for all infants <1-year old was estimated to be 0.002441 mg/kg/day (percent acute RfD of 2.4); 99th percentile 0.011178 mg/kg/day (percent acute RfD of 11.2); and 99.9th percentile 0.029462 mg/kg/day (percent acute RfD of 29.5). The 95th percentile of exposure for nursing infants <1-year old was estimated to be 0.001247 mg/kg/day (percent acute RfD of 1.3); 99th percentile 0.004540 mg/kg/day (percent acute RfD of 4.5); and 99.9th percentile 0.011659 mg/kg/day (percent acute RfD of 11.7). The 95th percentile of exposure for non-nursing infants <1-year old (the most highly exposed population subgroup) was estimated to be 0.002786 mg/kg/day (percent acute RfD of 2.8); 99th percentile 0.012899 mg/kg/day (percent acute RfD of 12.9); and 99.9th percentile 0.033071 mg/kg/day (percent acute RfD of 33.1). The 95th percentile of exposure for children 1 to 6 years old and children 7 to 12 years old was estimated

to be, respectively, 0.001942 mg/kg/day (percent acute RfD of 1.9) and 0.001244 mg/kg/day (percent acute RfD of 1.2); 99th percentile 0.005670 mg/kg/day (percent acute RfD of 5.7) and 0.003082 (percent acute RfD of 3.1); and 99.9th percentile 0.018280 mg/kg/day (percent acute RfD of 18.3) and 0.009335 (percent acute RfD of 9.3). The 95th percentile of exposure for females (13+/nursing) was estimated to be 0.001128 mg/kg/day (percent acute RfD of 1.1); 99th percentile 0.003112 mg/kg/day (percent acute RfD of 3.1); and 99.9th percentile 0.012903 mg/kg/day (percent acute RfD of 12.9). Therefore, FMC Corporation concludes that the acute dietary risk of zeta-cypermethrin, as estimated by the dietary risk assessment, does not appear to be of concern.

2. *Infants and children—i. General.* In assessing the potential for additional sensitivity of infants and children to residues of zeta-cypermethrin, FMC Corporation considered data from developmental toxicity studies in the rat and rabbit, and a 2-generation reproductive study in the rat. The data demonstrated no indication of increased sensitivity of rats to zeta-cypermethrin or rabbits to cypermethrin *in utero* and/or postnatal exposure to zeta-cypermethrin or cypermethrin. The developmental toxicity studies are designed to evaluate adverse effects on the developing organism resulting from pesticide exposure during prenatal development to one or both parents. Reproduction studies provide information relating to effects from exposure to the pesticide on the reproductive capability of mating animals and data on systemic toxicity. FFDCA section 408 provides that EPA may apply an additional margin of safety for infants and children in the case of threshold effects to account for prenatal and postnatal toxicity and the completeness of the data base.

ii. *Developmental toxicity studies.* In the prenatal developmental toxicity studies in rats and rabbits, there was no evidence of developmental toxicity at the HDT (35.0 mg/kg/day in rats and 700 mg/kg/day in rabbits). Decreased body weight gain was observed at the maternal LOAEL in each study; the maternal NOAEL was established at 12.5 mg/kg/day in rats and 100 mg/kg/day in rabbits.

iii. *Reproductive toxicity study.* In the 2-generation reproduction study in rats, offspring toxicity (body weight) and parental toxicity (body weight, organ weight, and clinical signs) was observed at 27.0 mg/kg/day and greater. The parental systemic NOAEL was 7.0 mg/kg/day and the parental systemic LOAEL was 27.0 mg/kg/day. There were