

LOC is 100. To estimate risk, a ratio of the NOAEL to exposures (margin of exposure (MOE) = NOAEL/exposure) is calculated and compared to the LOC.

The linear default risk methodology ( $Q^*$ ) is the primary method currently used by the Agency to quantify carcinogenic risk. The  $Q^*$  approach assumes that any amount of exposure will lead to some degree of cancer risk. A  $Q^*$  is calculated and used to estimate

risk which represents a probability of occurrence of additional cancer cases (e.g., risk is expressed as  $1 \times 10^{-6}$  or one in a million). Under certain specific circumstances, MOE calculations will be used for the carcinogenic risk assessment. In this non-linear approach, a "point of departure" is identified below which carcinogenic effects are not expected. The point of departure is typically a NOAEL based on an

endpoint related to cancer effects though it may be a different value derived from the dose response curve. To estimate risk, a ratio of the point of departure to exposure ( $MOE_{cancer} = \text{point of departure/exposures}$ ) is calculated. A summary of the toxicological endpoints for cyprodinil used for human risk assessment is shown in Table 2 of this unit:

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

Exposure Scenario	Dose Used in Risk Assessment, UF	FQPA SF and Endpoint for Risk Assessment	Study and Toxicological Effects
Acute Dietary females 13–50 years of age	Developmental NOAEL = 150 mg/kg/day UF = 100 Acute RfD = 1.5 mg/kg/day	FQPA SF = 1X aPAD = acute RfD ÷ FQPA SF = 1.5 mg/kg/day	Developmental Toxicity - rabbit Developmental LOAEL = 400 mg/kg/day based on slight increase of litters showing extra ribs (13th).
Chronic Dietary all populations	NOAEL = 2.7 mg/kg/day UF = 100 Chronic RfD = 0.03 mg/kg/day	FQPA SF = 1X cPAD = chronic RfD ÷ FQPA SF = 0.03 mg/kg/day	2-Year Chronic Toxicity/Carcinogenicity - rat LOAEL = 35.6 mg/kg/day based on degenerative liver lesions (spongiosis hepatitis) in males.
Cancer (oral, dermal, inhalation)	Classification: "not likely to be carcinogenic to humans"		

\* The reference to the FQPA SF refers to any additional SF retained due to concerns unique to the FQPA.

### C. Exposure Assessment

1. *Dietary exposure from food and feed uses.* Tolerances have been established (40 CFR 180.352) for the residues of cyprodinil, in or on a variety of raw agricultural commodities. Risk assessments were conducted by EPA to assess dietary exposures from cyprodinil in food as follows:

i. *Acute exposure.* Acute dietary 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 one day or single exposure. The Dietary Exposure Evaluation Model (DEEM®) analysis evaluated the individual food consumption as reported by respondents in the USDA insert 1989–1992 nationwide Continuing Surveys of Food Intake by Individuals (CSFII) and accumulated exposure to the chemical for each commodity. The following assumptions were made for the acute exposure assessments: 100% crop treated (PCT) and tolerance-level residues for cyprodinil on all treated crops. This assessment was a Tier I analysis. However, the only acute endpoint identified was for the population subgroup females 13–50 years old based on a slight increase of litters showing extra ribs (13th). No effects that could be attributed to a single exposure were observed (no endpoint was chosen) for any other

population subgroup, including the general U.S. population; therefore, an acute dietary assessment for the general U.S. population or other subgroups was not conducted.

ii. *Chronic exposure.* In conducting this chronic dietary risk assessment the Dietary Exposure Evaluation Model (DEEM®) analysis evaluated the individual food consumption as reported by respondents in the USDA 1989–1992 nationwide Continuing Surveys of Food Intake by Individuals (CSFII) and accumulated exposure to the chemical for each commodity. The following assumptions were made for the chronic exposure assessments: 100% crop treated (PCT) and tolerance-level residues for cyprodinil on all treated crops. This assessment was a Tier I analysis.

2. *Dietary exposure from drinking water.* The Agency lacks sufficient monitoring exposure data to complete a comprehensive dietary exposure analysis and risk assessment for cyprodinil in drinking water. Because the Agency does not have comprehensive monitoring data, drinking water concentration estimates are made by reliance on simulation or modeling taking into account data on the physical characteristics of cyprodinil.

The Agency uses the Generic Estimated Environmental Concentration

(GENEEC) or the Pesticide Root Zone/Exposure Analysis Modeling System (PRZM/EXAMS) to estimate pesticide concentrations in surface water and SCI-GROW, which predicts pesticide concentrations in groundwater. In general, EPA will use GENEEC (a tier 1 model) before using PRZM/EXAMS (a tier 2 model) for a screening-level assessment for surface water. The GENEEC model is a subset of the PRZM/EXAMS model that uses a specific high-end runoff scenario for pesticides. GENEEC incorporates a farm pond scenario, while PRZM/EXAMS incorporate an index reservoir environment in place of the previous pond scenario. The PRZM/EXAMS model includes a percent crop area factor as an adjustment to account for the maximum percent crop coverage within a watershed or drainage basin.

None of these models include consideration of the impact processing (mixing, dilution, or treatment) of raw water for distribution as drinking water would likely have on the removal of pesticides from the source water. The primary use of these models by the Agency at this stage is to provide a coarse screen for sorting out pesticides for which it is highly unlikely that drinking water concentrations would ever exceed human health levels of concern.