United States Environmental Protection Agency | Prevention, Pesticides And Toxic Substances (7508C) | EPA-738-F99-009 September 1999

R.E.D. FACTS

Pebulate

Pesticide Reregistration

All pesticides sold or distributed in the United States must be registered by EPA, based on scientific studies showing that they can be used without posing unreasonable risks to people or the environment. Because of advances in scientific knowledge, the law requires that pesticides which were first registered before November 1, 1984, be reregistered to ensure that they meet today's more stringent standards.

In evaluating pesticides for reregistration, EPA obtains and reviews a complete set of studies from pesticide producers that describe the human health and environmental effects of each pesticide. To implement provisions of the Food Quality Protection Act of 1996, EPA considers the special sensitivity of infants and children to pesticides, as well as aggregate exposure of the public to pesticide residues from all sources, and the cumulative effects of pesticides and other compounds with common mechanisms of toxicity. The Agency develops mitigation measures or regulatory controls needed to effectively reduce each pesticide's risks. EPA then reregisters pesticides that meet the safety standard of the FQPA and can be used without posing unreasonable risks to human health or the environment.

When a pesticide is eligible for reregistration, EPA explains the basis for its decision in a Reregistration Eligibility Decision (RED) document. This fact sheet summarizes the information in the RED document for reregistration of Pebulate, case 2500.

Use Profile

Pebulate is an herbicide used for control of grassy and broadleaf weeds in sugar beets, tobacco, and tomatoes. Pebulate is predominantly applied before planting and is immediately soil incorporated to prevent volatilization. There is also a layby application (an application of pesticide which occurs in conjunction with mechanical weeding), which is used in the western states (defined as California, Arizona, and Nevada) only. There are no residential uses for this herbicide.

Regulatory History

Pebulate was first registered as a pesticide in the United States in 1961. There were three products registered that contained the active ingredient Pebulate. These products were Tillam Technical, Tillam 6E, and Tillam 10G. In 1987, these products were transferred from Stauffer Basic Chemical Holdings, Inc., to Zeneca Ag Products.

In 1996, Tillam 10G was canceled at the request of the registrant following an Agency request for residue data for the 10G formulation. As of 1999, the registrant is supporting continued registration of the technical grade product, EPA Reg. No. 10182-213, and one end-use product, the 6 lb. active ingredient per gallon emulsifiable concentrate (EC), EPA Reg. No. 10182-158.

Human Health Assessment

Toxicity

Pebulate is in the class of thiocarbamates and is a reversible cholinesterase inhibitor. As with other chemicals in this class, neurotoxicity is the major toxic effect for pebulate. Pebulate had low acute oral, dermal, and inhalation toxicity. It was a slight to mild irritant to the eye or skin and was not a skin sensitizer. Toxicity categories, which are classified as 1 (most toxic) through 4 (least toxic), were either 3 or 4 for Pebulate. There was no evidence of increased tumor incidence in the carcinogenicity studies in rats and mice, and the mutagenic test battery also indicated that pebulate was not mutagenic. Therefore, pebulate was classified as "not likely" to be a human carcinogen.

Dietary Exposure

All doses for risk assessment purposes were assessed using the conventional safety factors of 10x for interspecies extrapolation and 10x for intraspecies variability. In addition, the FQPA safety factor of 10x was retained for pebulate because of (i) the severe neuropathology exhibited in studies with adult animals, (ii) the structural similarities to other thiocarbamates for which increased susceptibility of developing fetuses has been demonstrated, and (iii) the outstanding requirement for a developmental neurotoxicity study. In the current analysis, the 10x safety factor was applied to the various populations of infants and children as well as to females (13-50 years, i.e., females of childbearing age), because the Agency is concerned about potential developmental (*in utero* exposure) effects of pebulate. The 10x FQPA factor is not applied to males or to the general population. Acute and chronic dietary risk estimates are calculated as <1% of the acute and chronic population adjusted doses (aPAD and cPAD, respectively) for adults, infants, and children, which are significantly below the Agency's level of concern.

For the aggregate risk to a population subgroup, the Agency adds the calculated risk from exposures to food, drinking water, and residential exposure; for Pebulate there are no expected residential exposures. The Agency concludes that the aggregate risk estimate is not of concern for infants, children, and woman (13-50 years of age).

Cumulative Risk Assessment

At this time, the Agency does not believe it has enough reliable information concerning common mechanism issues to determine whether pebulate, a thiocarbamate, shares a common mechanism of toxicity with other cholinesterase-

inhibiting chemicals. Therefore, for the purposes of this RED, the Agency has assumed that pebulate does not share a common mechanism of toxicity with cholinesterase-inhibiting chemicals.

Occupational and Residential Exposure

With the use of personal protective equipment (PPE), risks for occupational handlers were below the Agency's level of concern, which is a margin of exposure (MOE) greater than 100, for most scenarios involving pebulate mixers and loaders. In addition to the PPE which is currently on the label (long-sleeved shirts, long pants, shoes, socks, protective eyewear, and chemical-resistant gloves), organic vapor respirators are required when preparing solutions for chemigation and application at the highest use rates in the western states (defined as California, Arizona, and Nevada). For commercial operators, closed systems are required for mixing and loading of pebulate impregnated on dry bulk fertilizer and in liquid formulation in combination with fluid fertilizer. The MOEs for the pebulate applicator exposures are acceptable with the PPE that is currently on the label, with one exception. Applying dry bulk fertilizer to tobacco in the western states will also require the use of an organic vapor respirator or an enclosed cab with an organic vapor air filtration system. In the absence of dermal exposure data, the Agency is also requiring that chemical-resistant gloves be worn during transplanting of crop seedlings and is calling in data on this practice.

Environmental Assessment

Based on laboratory studies, pebulate residues appear to be mobile, through volatility, leaching, and runoff to surface water and may persist in soil under both aerobic and anaerobic conditions. However, the mobility and persistence of pebulate and its degradates in the field is less clear because of inadequate data. Given the volatile nature of the compound, it is likely that significant volatilization of pebulate occurs under field conditions, even with soil incorporation. Uncertainties in the environmental fate of pebulate residues are associated with the lack of environmental fate data for pebulate sulfoxide. Environmental fate data are needed for pebulate sulfoxide to clarify the fate of pebulate residues in the environment.

Pebulate is not likely to pose an acute risk to birds or most mammals. Some acute and chronic risk to strictly insectivorous mammals may exist before incorporation, although exposure may be mitigated by volatility and incorporation of pebulate into soils.

Pebulate does not appear to pose a significant risk to aquatic organisms. Risk quotients for freshwater fish, invertebrates, and aquatic plants were below the Agency's levels of concern for acute effects. Chronic toxicity endpoints are not expected to be substantially lower than predicted estimated environmental concentrations, although no direct conclusions are possible due to the lack of actual chronic toxicity data. Chronic aquatic data may be requested if pebulate uses are

increased. Although pebulate use on tobacco could result in estuarine exposure, the potential risk to estuarine species is difficult to predict because there are no acceptable estuarine toxicity data.

Little hazard to nontarget terrestrial plants is expected from incorporated applications of pebulate. However, risk quotients based on default spray drift assumptions from irrigation systems and possible runoff exposure suggest potential adverse effects on growth in nontarget terrestrial plants exposed to pebulate. There is uncertainty for this conclusion because (1) there are no data from which to directly estimate drift exposure and (2) pebulate is volatile, which is likely to reduce exposure. There is also some uncertainty associated with the potential for exposure from volatilized residues depositing on nontarget plants. Risk to honeybees or other beneficial insects is expected to be minimal because pebulate is soil-incorporated.

Risk Mitigation

To lessen the risks posed by pebulate, the Agency is requiring the following mitigation measures for products containing pebulate. The specific language for the label is specified in Section V of the RED document.

To reduce the amount of residue in food crops, the Agency is requiring a plantback harvest interval of 30 days for tomatoes, and establishing a 4 month plantback interval (PBI) for all rotated food crops. To protect workers, the Agency is requiring the use of additional PPE (including coveralls, chemical-resistant gloves, and organic vapor respirators) for all chemigation mixers/loaders and for mixers/loaders when preparing solutions for an application in the western states at the highest use rate (>6 lb ai/Acre). In addition, closed loading systems are required for commercial operations that impregnate dry bulk fertilizer with pebulate and that combine pebulate (fluid formulation) with liquid fertilizer. An organic vapor respirator or an enclosed cab with a filtration system equal to that of an organic vapor respirator is required for commercial applicators when applying dry bulk fertilizer impregnated with pebulate to tobacco. Chemical-resistant gloves are required for workers involved with mechanical transplanting or mechanically assisted transplanting of tomatoes and tobacco.

Additionally, the label must specify that pebulate is prohibited for greenhouse uses and must contain language that requires the use of best management practices to protect nontarget terrestrial and semiaquatic plants (mainly grass related species) from runoff and drift.

Additional Data Required

EPA is requiring the following additional generic studies for Pebulate to confirm its regulatory assessments and conclusions: stability to metals, estuarine toxicity, developmental neurotoxicity, dermal and inhalation studies, leaching/adsorption/desorption, field volatility, and terrestrial field dissipation.

Product Labeling Changes Required

All pebulate end-use products must comply with EPA's current pesticide product labeling requirements and with the following. For a comprehensive list of labeling requirements, please see the pebulate RED document.

The label must specify that chemical-resistant gloves must be worn while transplanting tomato and tobacco seedlings. In addition, an organic vapor respirator must be worn by most mixers/loaders. Commercial mixer/loaders and some commercial applicators must use closed systems, because of the high volume of chemical to which they will be exposed. Also, the label must specify that use of pebulate in a greenhouse is prohibited.

Regulatory Conclusion

The use of currently registered products containing pebulate in accordance with approved labeling will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, all uses of these products are eligible for reregistration.

For More Information

EPA is requesting public comments on the Reregistration Eligibility Decision (RED) document for pebulate during a 60-day time period, as announced in a Notice of Availability published in the Federal Register. To obtain a copy of the RED document or to submit written comments, please contact the Pesticide Docket, Public Information and Records Integrity Branch, Information Resources and Services Division (7502C), Office of Pesticide Programs (OPP), US EPA, Washington, DC 20460, telephone 703-305-5805. Electronic copies of the RED and this fact sheet are available on the Internet (http://www.epa.gov/REDs).

Printed copies of the RED and fact sheet can be obtained from EPA's National Service Center for Environmental Publications (EPA/NSCEP), PO Box 42419, Cincinnati, OH 45242-2419, telephone 1-800-490-9198; fax 513-489-8695.

Following the comment period, the pebulate RED document also will be available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, telephone 1-800-553-6847 and 703-605-6000.

For more information about EPA's pesticide reregistration program, the pebulate RED, or reregistration of individual products containing pebulate, please contact the Special Review and Reregistration Division (7508C), OPP, US EPA, Washington, DC 20460, telephone 703-308-8000.

For information about the health effects of pesticides, or for assistance in recognizing and managing pesticide poisoning symptoms, contact the National Pesticide Telecommunications Network (NPTN). Call toll-free 1-800-858-7378, from 6:30 am to 4:30 pm Pacific Time, or 9:30 am to 7:30 pm Eastern Standard Time, seven days a week (ace.orst.edu/info/nptn).