UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: EFED's response to 90-day comments the molinate RED (Chemical # 041402, Reregistration Case # 818845, Bar Code # D261573)

FROM: F. Nicholas Mastrota
Environmental Risk Branch II
Environmental Fate and Effects Division (7507C)

F. Nicholas Mastrota 10/12/00

THROUGH: Tom Bailey, Chief
Environmental Risk Branch II
Environmental Fate and Effects Division (7507C)

Tom C. Bailey 10/12/00

TO: Robert McNally (60)
Special Review and Reregistration Division (7508C)

The instructions to this action says to review the 90-day response to the draft EFED chapter of the Molinate RED (MRID 449265-01). This 90-day response is identical to the 30-day response which was already submitted and reviewed by EFED. Therefore, I have attached a copy of the previous EFED review of the 30-day response.

MEMORANDUM

SUBJECT: EFED's response to comments the molinate RED (Chemical # 041402, Reregistration Case # 818845, Bar Code # D259942)

FROM: F. Nicholas Mastrota
Environmental Risk Branch II
Environmental Fate and Effects Division (7507C)

THROUGH: Jean Holmes, Acting Chief
Environmental Risk Branch II
Environmental Fate and Effects Division (7507C)

TO: Robert McNally (60)
Special Review and Reregistration Division (7508C)

ZENECA Ag Products has provided the Agency with comments on the draft EFED chapter of the RED for molinate. EFED has reviewed the comments and herein gives a response.

Environmental Fate and Drinking Water Assessment

Molinate Data for Surface Water Intakes in Louisiana

Zeneca asks the Agency to refer to a previously submitted supplemental report to resolve issues concerning the requirement of monitoring data for drinking water intakes. This report is titled "*Molinate: Drinking Water Exposure Assessment (United States); Response to USEPA EPA's Memorandum: Drinking Water Assessment for Molinate.*" This report will be reviewed by James Breithaupt, who will provide his response in a separate memo.

Ecological Effects Assessment

Avian Reproduction Testing

Zeneca says they will consider the request for avian reproduction testing. Avian reproduction testing with the mallard and bobwhite are required.

Freshwater Invertebrate Life-cycle

ZENECA states that the existing life-cycle study with the waterflea (MRID 406578-02) should be reclassified as "core". The study was classified as "supplemental" solely because growth was not evaluated in terms of dry weights, although growth was evaluated in terms of body length. The question of whether an invertebrate life-cycle study should be rejected when only length was measured as a growth parameter was resolved in 1994 by publication of the Pesticide Reregistration Rejection Rate Analysis–Ecological Effects (EPA 738-R-94-035). This document states on page 132 that "while both length and weight are preferable, only length is required until the Agency provides specific guidance indicating otherwise." Therefore, the Agency agrees with ZENECA that this study us acceptable. **The existing study, MRID 406578-02, is upgraded to "core" and fulfills the guideline requirement for a life-cycle study with an aquatic invertebrate (GLN 72-4b).**

Seedling Emergence and Vegetative Vigor Studies

As the response from ZENECA points out, the original draft of the Molinate RED erroneously referred to the seedling emergence/vegetative vigor study that was done for molinate as MRID 41610209, whereas the correct MRID for this study is 41613611. This occurred because the Data Evaluation Record (DER) for this study listed the wrong MRID number in the header. However, the text of the DER's shows that it pertains to a study with molinate (ORDRAM 8E) and gives the correct MRID number (41613611). Therefore, the reported conclusions are correct for this study. The MRID numbers have been corrected in the RED.

The data evaluation concluded that the seedling emergence and vegetative vigor studies were invalid and supplemental, respectively. These conclusions were established by an independent contractor and reviewed by EFED staff. Rationale for the conclusions are given in the DERs. Since no additional data or information have been provided on these studies, there is no need for EFED to reevaluate these conclusions.

Risk to Birds from EC Products

ZENECA agrees with our conclusion that molinate poses a minimal risk to birds; however, they object to our conclusion that the margin of safety is not great enough to rule out possible risk to threatened or endangered species. They argue that applications of molinate at 4 lb ai/A is very rare since most of the flowable applications are in the form of Arrosolo, which has a maximum use rate of 3 lb ai/A, and applications of Ordram 8E are typically made at 3 lb ai/A rather than the maximum label rate of 4 lb ai/A. It is the policy of the Agency to assess risk at the maximum label rate since this is the only rate that the Agency has authority to regulate under FIFRA. It is sometimes useful to also consider the risk posed by typical use rates when they differ considerably from the maximum rate. In this case, however, use of the typical application rate leads to the same conclusion as use of the maximum rate.

EPA policy state that the Agency should presume the possibility of risk to threatened and endangered terrestrial wildlife when the risk quotient (EEC/LC_{50}) is greater than 0.1. Another way of stating this is that possible risk is presumed when there is less than a ten-fold margin of safety between the EEC and the LC_{50}. Toxicity tests with birds show that the subacute dietary LC_{50} is greater than 5620 ppm. Thus, risk would be presumed for threatened and endangered species when the EEC is equal to or greater than 562 ppm. Based on the standard nomogram method used for risk screens, the maximum EEC for short grass following spray applications at 3 and 4 lb ai/A are 720 and 960 ppm, respectively. Therefore, possible risk to threatened and endangered birds and reptiles is concluded for the typical as well as the maximum use rates.

This conclusion of "possible risk" is uncertain because the acute toxicity tests did not test to levels great enough to determine the actual dietary LC_{50} for the mallard or bobwhite. It is possible that the actual acute toxicity to birds is low enough that risk to threatened and endangered birds and reptiles could be ruled out, but this would require further toxicity testing to ascertain. Tests establishing that the LC_{50}'s for the mallard and bobwhite at levels greater than 9600 ppm, or limit tests showing less than 50% mortality at a dietary concentration of 9600 ppm or greater, would be sufficient evidence to remove concern for possible acute risk. However, one needs to realize that use of molinate may also pose a risk to threatened and endangered birds and reptile through chronic toxicity even if the acute risk is low. Therefore, ruling out all risk to these species would also require avian reproduction studies showing that the chronic NOEC's for the mallard and bobwhite are greater than 960 ppm.

Risk to Mammals from EC Products

ZENECA again points out that most of the use of EC products of molinate is at 3 lb ai/A with only a small amount used at the rate of 4 lb ai/A. As stated previously, the Agency's policy is to assess risk based on the maximum rate permitted on the label. Furthermore, mammalian acute RQ's for use at 3 lb ai/A are as high as 1.25, which substantially exceeds the LOC of 0.5. Thus, high risk would be concluded whether maximum or typical use rates are presumed. However, for clarity, we will state in the risk characterization that unincorporated use of Ordram 8E represents only about 0.2% of total usage of molinate.

The Agency agrees that residues that fall on levees and on areas surrounding rice fields will likely dissipate rapidly due to volatilization. This is not a factor that would effect the acute or chronic risk quotient calculations, which are based on peak EEC's that predicted immediately following application. Short term exposure to molinate, as would occur from mammals feeding during or immediately after application, can cause acute and even reproductive effects. However, the rapid dissipation would reduce the amount time-averaged exposure levels and the time that high residues would be present. A discussion of how this may reduce the risk to mammals will be added to the risk characterization section of the EFED chapter.

ZENECA points out that chronic and subchronic data suggest that rodents are more sensitive

than other taxa of mammals. They list additional data for the rabbits and dogs that show levels of chronic toxicity lower than that for rats. This phenomenon is discussed in the risk characterization section of the chapter. It is noted that even if the impact of molinate from chronic toxicity is limited to only rodents, it would have significant ecological implications because of the important ecological function of rodents in most terrestrial ecosystems.

Finally, ZENECA summarizes information from a published study (Imai and Kuwatsuka, 1984) on plant uptake of molinate and uses this information to calculate revised risk quotients for acute and chronic risk to mammals. These risk quotients do not represent the greatest potential for risk for application of EC products because the expected environmental concentrations (EEC's) are based on residues measured in rice in the plant uptake study. These values represent only residues that would be taken up by the plants from the soil and water, whereas much greater levels of residues would occur when the vegetation of plants are sprayed with molinate. Emerged weeds and rice plants in the rice field are expected to receive direct spraying, and grass and weeds occurring in adjacent areas that would be receive exposure through spray drift. Direct application of liquid molinate to the flood water (i.e., chemigation) is the only type of EC application for which the plant uptake concentrations would represent the maximum EEC since this is the only type of EC application not likely to result in any direct spraying or drift onto vegetation. EFED is preparing a new refined risk assessment to represent this scenario. This new assessment, which follows the general approach used in the assessment done by ZENECA, will be added to the final molinate RED.

The Agency does not agree with ZENECA's interpretation of the paper on plant uptake and translocation of molinate (Imai and Kuwatsuka, 1984). In a series of laboratory plant uptake studies, Imai and Kuwatsuka (1984) exposed rice seedlings to molinate by soaking them in a molinate solution or transplanted to soil and covered the soil with a solution. The concentration of the molinate solution used in this study was 10 ppm, which ZENECA correctly equates to the approximate instantaneous maximum concentration for a seasonal application rate of 9 lb ai/A into 4 inches of water. The Agency does not see a basis for the claim by ZENECA that "peak concentrations for molinate in young rice plant shoots from all three experiments were ≤9.4 ppm (47 ppm dry weight x 80% water in rice plant = 9.4 ppm)." The published paper does not provide the exact concentrations measured in rice shoots, but only presents the data graphically. Figure 2 in the paper graphs the molinate concentrations in plant shoots and roots over time for the various experiments (of which there were four, not three). After four days of exposure, molinate concentrations in all experiments were much greater than the 47 ppm level claimed by ZENECA. The experiment which best simulated field conditions was one in which seedlings were transplanted into soil, the soil was covered with water, and molinate was gradually dripped into the water to reach a concentration of 10 ppm. In this experiment, the day-4 concentration of molinate in the shoots of rice plants appears to be approximately 100 ppm based on visual examination of Figure 2. Assuming that plants are 80% water, the equivalent wet-weight concentration would be 20 ppm. In addition, ZENECA has ignored that greater concentrations of molinate were taken up by barnyard grass, which could also be a source of dietary exposure to wildlife. **The Agency would be**

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interested in receiving any additional information that ZENECA may have on the findings of this study, especially data on measured molinate concentrations in rice and barnyard grass. The Agency also requests that ZENECA submit a detailed explanation on how they derived their estimated molinate concentration in plant shoots of "≤9.4 ppm".

Risk to Mammals from Granular Products

ZENECA claims that the preplant-incorporated use of molinate is minor (only about 5% of the use of granular products), and that the majority of use is made postflood. They claim that postflood applications would not pose a risk to mammals because the granules would be covered by water and quickly release the active ingredient into the water. The information on the low percent usage of granular products for PPI applications will be added to the risk characterization. The effect of the flood water reducing exposure to mammals is already discussed in this section.

ZENECA also claims that granules that fall onto levees and areas surrounding the rice fields would rapidly lose the active ingredient through volatility. While it is true that molinate volatilizes fairly rapidly from water and moist water, the Agency has no information on the rate of volatility from granules. Volatility from granules might be much less than from soil because granules are in a dry state. Also, granular pesticide formulators might formulate granules to minimize loss from volatilization. Therefore, the Agency will not consider volatilization from granules as a factor that would reduce risk unless data can be provided on the rate that the active ingredient volatilizes from granules.

The registrant lists a number of factors that they claim would make the actual risk from molinate less that predicted by the risk assessment. This discussion is very biased, concentrating only on those factors that would make the actual risk lower than the predicted risk. There are an equal or greater number of factors that are not discussed that would make the actual risk greater than the predicted risk. These include, but are not limited to, 1) greater consumption rate of animals in the wild compared to in the lab, 2) sensitivity of some species exceeding that of the test species, 3) greater environmental stresses of animals in the wild (temperature extremes, food shortage, parasites, etc.), 4) cumulative effects from exposure to multiple pesticides, 5) exposure through routes other than those considered in the risk assessment, and 6) increased mortality caused by sublethal effects. A refined assessment must consider these factors as well as those that would tend to decrease risk. It is impossible to know *a priori* if quantitative consideration of all of these factors and assumptions would result in a conclusion of risk that is greater or less than that obtained by the screen. However, based on experience with other chemicals, EFED does not believe that our screening-level risk assessments are overly conservative.

The Agency has previously conducted an acute risk assessment for birds and mammals exposed to granular molinate using the LD_{50}-per-square foot method. This previous assessment is

appropriate for assessing risk from unincorporated granules that fall on the levees and field boundaries. The Agency will conduct additional refined assessments that will follow the approach used in the assessment done by ZENECA. These refined assessments will cover acute and chronic risk from granular and chemigation applications of molinate. An assessment for herbivorous animals will be conducted similarly to the one conducted by ZENECA, except that the molinate concentrations in plants will be based upon the Agency's interpretation of the findings of Imai and Kuwatsuka (1984). The Agency will conduct another risk assessment carnivorous animals consuming small animal prey in the flooded rice field. Concentrations in the prey items will be calculated by multiplying ambient water concentrations by the whole-fish bioconcentration factor. ZENECA is encouraged to supply additional information that might help in the interpretation of the findings of Imai and Kuwatsuka (1984) for use in these assessments.

Risk to Fish in California

The Agency has considered Zeneca's comments on the established water quality criteria for molinate at 35 ppb and comments on the alleviation of fish kills following imposition of holding period requirements in 1991. The Agency agrees that the holding period requirements have had a significant effect on reducing risk to fish in California, which is why we concluded that molinate use in California does not pose a high risk to fish. Nevertheless, the peak water concentrations measured in California in recent years are great enough to trigger consideration of mitigating risk to fish through restricted use registration. This is because, during times of peak concentrations, the margin of safety between peak EEC's and acute toxicity levels are less than 10. Exceeding this trigger means that restricted use registration should be *considered* as a mitigation measure, but does not mean that it necessarily will be imposed. Indeed, acute risk to fish should be a minor factor in deciding whether molinate should be a restricted use pesticide.

Risk to Fish in the Southern USA

Zeneca concurs with EPA conclusion of minor acute and subacute risk to fish in the Southern USA.

Risk to Aquatic Invertebrates in California

The information that Zeneca presents concerning the water quality criteria (WQC) for molinate does not affect the conclusions of the Agency's risk assessment. As for risk to fish, consideration of restricted use registration was triggered for aquatic invertebrates in California because the margin of safety between peak EEC's and acute toxicity levels are less than 10. The conclusion of high chronic risk is not affected by the data generated for establishing the WQC because these data were from only acute toxicity studies, not chronic studies.

Risk to Aquatic Invertebrates in the Southern USA

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