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OFFICE OF
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MEMORANDUM

SUBJECT: Revised draft of Environmental Fate and Ecological Risk Assessment of Chloropicrin following the review of 30-day Error Correction Comments

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The attached document is the Environmental Fate and Effects Division (EFED) revised screening-level risk assessment in support of the Reregistration Eligibility Decision of chloropicrin. Revisions include an update on ecological incidents.

The Environmental Fate and Effects Division (EFED) has completed its review of comments received from the Chloropicrin Manufacturers' Task Force (CMTF) on the EFED September, 2005 draft environmental fate and ecological risk assessment. Many of the comments received from the CMTF represent their interpretation related to exposure models or scenarios used in EFED's assessment and do not pertain to actual errors. The EFED risk assessment has been conducted in general accordance with the Agency guidance on ecological risk assessment and the OPP ecological risk assessment Overview document. Since the intent of the initial 30-Day comment period is to simply correct obvious errors (e.g. calculation errors) in the chapter, issues

beyond this will be considered along with future public comments in the Phase III review process.

The focus of this risk assessment is on the pre-plant soil fumigant use of chloropicrin, used to control a broad range of soil pathogens. Chloropicrin is typically applied as a liquid once per growing season through soil injection or drip irrigation to fumigate the upper six to twelve inches of soil 14 days or more before planting. The maximum application rate is 350 lbs a.i./Acre, with 300 lbs a.i./Acre the maximum for drip irrigation. The Problem Formulation, Analysis, Risk Characterization, and Executive Summary for this assessment can be found in the attached document.

Outstanding Data Requirements and Data Gaps

Environmental Fate:

The environmental fate data base for the parent compound provided mostly supplemental information (Table 1A-B). Key environmental fate studies such as aerobic soil metabolism and photolysis in air have several deficiencies and problems. Data related to these key environmental fate processes were also obtained from open literature to complete the environmental fate and exposure assessment. However, no additional environmental fate data for Chloropicrin are required at this time.

Ecological Effects:

The following data are needed on chloropicrin for ecological risk assessment. These data needs are similar to those available or previously specified as needed for risk assessment for methyl bromide and for the degradate MITC as part of the metam-sodium risk assessment. Table 1A-A lists the status of the ecological effects data requirements for chloropicrin.

71-1 Avian Acute Oral. The current estimate of avian risk is based largely on the mammal assessment. This basic study will contribute to a risk assessment specific to birds. It will 1) enable a comparison to the mammal acute oral data and 2) enable the use of an EFED spreadsheet to estimate avian acute inhalation toxicity based on the mammal acute oral and inhalation data.

----- Avian acute inhalation. The current estimate of avian risk is based largely on the mammal assessment. This study will enable an inhalation risk assessment specific to birds. Since the risk assessment for terrestrial wildlife is focused on inhalation and this study will provide actual inhalation data rather than an estimation based on acute oral data, it is of even higher priority than the acute oral study.

-----Avian sub-chronic/chronic inhalation. This study is needed for risk assessment, due to the potential for repeat and/or continuous exposure to birds resulting from the use of chloropicrin on multiple fields over multiple days in any given geographic area.

870.1300. Acute inhalation toxicity test – rat. The existing study (MRID 45117902) is classified by HED as Acceptable/Non-guideline. The 7/25/00 DER and 1/31/05 Revised HED Human Health Risk Assessment state: “The LC50 calculated for the study should not be considered to be a true LC50 for chloropicrin. Due to the sacrifice of all live animals at day 3 of the study instead of day 14, and too large of exposure particle sizes, the true LC50 could be lower.” Thus, a new study will enable an improved wild mammal risk assessment with reduced uncertainty. Please note that although EFED needs the results this study for risk assessment, it is not listed in Appendix E since it is an HED guideline and EFED does not review these studies.

72-1(a) and (c) Acute Fish Toxicity – bluegill and rainbow trout. The risk assessment is currently relying on supplemental data, with indeterminate toxicity values. Flow-through studies with measured concentrations will greatly reduce uncertainty.

72-2(a) Acute aquatic invertebrate toxicity. The risk assessment is currently relying on supplemental data, with indeterminate toxicity values. Flow-through studies with measured concentrations will greatly reduce uncertainty.

72-3(a) Acute Marine/Estuarine Fish. Given the use patterns of chloropicrin, marine/estuarine species could be exposed. This study will enable a risk assessment specific for marine/estuarine species exposure.

72-3(b) Acute Marine/Estuarine Mollusk. Given the use patterns of chloropicrin, marine/estuarine species could be exposed. This study will enable a risk assessment specific for marine/estuarine species exposure. It will also improve certainty with the endangered species risk assessment, as this test species may be more representative of endangered freshwater mussels than the freshwater *Daphnia*.

72-3 (c) Acute Marine/Estuarine Shrimp. Given the use patterns of chloropicrin, marine/estuarine species could be exposed. This study will enable a risk assessment specific for marine/estuarine species exposure. One literature search toxicity value is available, but it is from a static study without measured concentrations.

72-4(a) Early Life-stage Fish – Freshwater. Current aquatic modeling indicates the potential for chronic aquatic exposure to chloropicrin. This study will enable a chronic risk assessment for freshwater fish.

72-4(a) Early Life-stage Fish – Marine/Estuarine. Current aquatic modeling indicates the potential for chronic aquatic exposure to chloropicrin. This study is reserved pending the submission and review of the above early life-stage studies with a freshwater fish species.

72-4(b) Life-Cycle Aquatic Invertebrate. Current aquatic modeling indicates the potential for chronic aquatic exposure to chloropicrin. This study will enable a chronic risk assessment for aquatic invertebrates.

72-5 Life-Cycle Fish. This study is reserved, pending submission and review of early life-stage fish testing.

123-1(a) Seed Germination/Seedling Emergence – Tier II. Chloropicrin is used in part due to its phytotoxicity at the application site, and a wide range of open literature and other non-guideline studies indicate the potential for plant damage. This study will enable the assessment of risk to non-target terrestrial plants off-site.

123-1(b) Vegetative Vigor – Tier II. Chloropicrin has at least some phytotoxicity on the treatment site, based on label and open literature information. This study will enable the assessment of risk to non-target terrestrial plants off-site.

123-2 Aquatic Plant Growth – Tier II. Chloropicrin has at least some phytotoxicity on the treatment site, based on label and open literature information. This study will enable the assessment of risk to non-target aquatic plants off-site.

141-1 Honeybee Acute contact. This basic study is now being requested for virtually all outdoor uses, and will help determine the need for, and specifics of, bee hazard labeling.

Uncertainties

Environmental Fate:

There are uncertainties in estimating chloropicrin exposure in surface water from post-application, due to tarping of the treated area. If tarping is used to minimize the volatilization of chloropicrin, the loading of the chemical through runoff will be limited until the tarp is sliced or removed from the field. The present version of the PRZM model, as well as the selected crop scenarios, has limited capabilities in discounting the load from runoff of applied chemical under a post-application tarp scenario. PRZM also has limited capabilities in capturing the partitions of a volatile chemical in air, water and sediment. Since the load of chloropicrin from runoff is considered in the PRZM/EXAMS simulation, the estimated concentrations of chloropicrin in surface water bodies may be upper bound.

There are uncertainties with both existing monitoring and modeling of air residues for the purpose of estimating exposure to terrestrial wildlife. Since field emission and air monitoring data of chloropicrin were collected greater than 1 meter above the ground surface, actual concentrations at ground level may differ from estimated air concentration using ISCTS3 modeling and ambient air monitoring. Air monitoring at ground-level of chloropicrin in the fumigated fields may reduce the uncertainty related to terrestrial exposure for wildlife.

Ecological Effects:

There are substantial uncertainties concerning the ecological effects of chloropicrin, in part due to the extremely limited data available for risk assessment. There are no studies considered fully acceptable for any taxonomic group or time exposure, except for the mammal acute oral and chronic inhalation data used.

The uncertainties associated with the risk to terrestrial organisms from chloropicrin use are mainly focused on the extent and effect of terrestrial animal exposure via inhalation. There is uncertainty with the mammal acute inhalation toxicity, as indicated above. Avian inhalation toxicity data are not available at all, as also noted. In addition, the lack of avian acute oral data prevents an extrapolated estimation of inhalation toxicity based on mammal data. Terrestrial plant data are needed to conduct an assessment of risk to non-target terrestrial plants off-site.

Because of the repeat exposures from applications to different fields on different days in a given geographic area, there is the added potential for chronic exposure. Acute inhalation studies are typically just 4 hours long. A subchronic/chronic avian inhalation study will enable EFED to address longer-term exposure to birds.

The uncertainties associated with the risk to aquatic organisms from chloropicrin are due to uncertainties over the length of exposure to this highly volatile chemical and to uncertainties over the toxicity (resulting mainly from the volatility). However, both acute and chronic exposure are possible, in part due to repeat or continuous input to the aquatic environment. Acute and chronic toxicity data are not available for most fish and aquatic invertebrate guideline test categories, freshwater or estuarine/marine. The risk assessment relies on supplemental data for freshwater fish and aquatic invertebrates.

EFED Label Recommendations

i. Manufacturing Use Product:

This pesticide is toxic to mammals, birds, fish, and aquatic invertebrates. Additionally, because it is a broad spectrum fumigant, it is presumed to also be toxic to additional organisms, including beneficial insects, amphibians, and reptiles. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

ii. End Use Products

This pesticide is toxic to mammals, birds, fish, and aquatic invertebrates. Additionally, because it is a broad spectrum fumigant, it is presumed to also be toxic to additional organisms, including beneficial insects, amphibians, and reptiles. Do not apply directly to water, or to areas

where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas.

iii. Surface and Ground Water Advisory

Do not slice or remove the tarp, if it is raining or if rain is expected within 48 hours. Since chloropicrin is very soluble, rain could cause chloropicrin remaining under the tarp to contaminate ground water through leaching and surface water through runoff.

Table 1A (A). Ecological Effects Data Requirements for: Chloropicrin

Guideline #	Data Requirement	Are Additional Data Needed for Risk Assessment?	MRID #'s	Study Classification
71-1(a)	Avian Acute Oral	Y	-----	-----
-----	Avian Acute Inhalation	Y	-----	-----
71-2(a)	Avian Dietary–quail	N	-----	-----
71-2(b)	Avian Dietary–mallard	N	-----	-----
-----	Avian Subchronic/Chronic Inhalation	Y	-----	-----
72-1(a)	Fish Acute Toxicity–bluegill	Y	FTLR 439	S
72-1(b)	Fish Acute Toxicity–rainbow trout	Y	FTLR 425	S
72-2(a)	Aquatic Invertebrate Acute Toxicity–freshwater	Y	130704	S
72-3(a)	Marine/Estuarine Acute Toxicity–Fish	Y	-----	-----
72-3(b)	Marine/Estuarine Acute Toxicity–Mollusk (shell deposition)	Y	-----	-----
72-3(c)	Marine/Estuarine Acute Toxicity–Shrimp	Y	-----	-----
72-4(a)	Fish Early Life Stage–freshwater	Y	-----	-----
72-4(a)	Fish Early Life Stage– marine/estuarine	Reserved	-----	-----
72-4(b)	Aquatic Invertebrate Life Cycle–freshwater	Y	-----	-----
123-1(a)	Seedling Germination/Seedling Emergence–Tier II	Y	-----	-----
123-1(b)	Vegetative Vigor–Tier II	Y	-----	-----
123-2	Aquatic Plant Growth – Tier II	Y		-----

Table 1A (A). Ecological Effects Data Requirements for: Chloropicrin

Guideline #	Data Requirement	Are Additional Data Needed for Risk Assessment?	MRID #'s	Study Classification
141-1	Honeybee Acute Contact	Y	-----	-----

A=Acceptable; S=Supplemental; U=Unacceptable; W=Waived; N/A=Not Applicable; NA=Not Available; Inv.=Invalid; R=Potentially Repairable

Table 1A (B). Environmental Fate Data Requirements for: Chloropicrin

Guideline #	Data Requirement	Is Data Requirement Satisfied?	MRID #'s	Study Classification
161-1	Hydrolysis	Y	43022401	A
161-2	Photodegradation in Water	Y	42900201	S
161-3	Photodegradation on Soil	N/A	NA	W
161-4	Photodegradation in Air	Y	05007865	A
162-1	Aerobic Soil Metabolism	Y	43613901	S
162-2	Anaerobic Soil Metabolism	N/A	-----	-----
162-3	Anaerobic Aquatic Metabolism	Y	43759301	S
162-4	Aerobic Aquatic Metabolism	N/A	-----	-----
163-1	Mobility-Column Leaching	Y	44191301	S
163-2	Laboratory Volatility	Y	43798601	A
163-3	Field Volatility	Reserved	-----	-----
164-1	Terrestrial Field Dissipation	N	43085101	S
165-4	Accumulation in Fish/ Bioconcentration	N/A	NA	W

A=Acceptable; S=Supplemental; U=Unacceptable; W=Waived; N/A=Not Applicable; NA=Not Available