

(6-22-94)

Shaughnessy No: 059101
DP Barcode: D204731
Date Out of EFGWB:

TO: Linda Propst/D. McNeilly
Reregistration Section III
Special Review and Registration Division

FROM: Henry Nelson, Ph.D., Head *H. Nelson*
Surface Water Section
Environmental Fate and Groundwater Branch/EFED (7507C)

Thru: Henry Jacoby, Chief *Henry Jacoby 8/5/94*
Environmental Fate and Groundwater Branch
Environmental Fate and Effects Division (7507C)

Attached, please find the EFGWB review of:

Chemical #: 059101

Common Name: Chlorpyrifos

Type of Product: Insecticide

Product Name: Lorsban 15G

Company Name: Dow/Elanco

Purpose: Review of protocol for small plot runoff study to determine the efficacy of VFSS in reducing chlorpyrifos runoff

Total Review Time: 1 Day

This is a review of a protocol for conducting a small plot runoff study to determine the effectiveness of 15 foot and 30 foot Vegetated Filter Strips (VFSS) in reducing chlorpyrifos runoff from agricultural fields.

DP BARCODE: D204731

CASE: 818975
SUBMISSION: S468501

DATA PACKAGE RECORD
BEAN SHEET

6-22-94
Nelson
REREG CASE # 0100

DATE: 06/22/94
Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REREGISTRATION ACTION: 635 PROTOCOL
CHEMICALS: 059101 Chlorpyrifos (ANSI)

100.00 %

ID#: 059101

COMPANY:

PRODUCT MANAGER: 73 LINDA PROPST

703-308-8165 ROOM: CS1 2B3

PM TEAM REVIEWER: DENNIS MCNEILLY

703-308-8066 ROOM: CS1 3F5

RECEIVED DATE: 06/21/94 DUE OUT DATE: 09/29/94

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 204731 EXPEDITE: N DATE SENT: 06/22/94 DATE RET.: / /

CHEMICAL: 059101 Chlorpyrifos (ANSI)

DP TYPE: 001 Submission Related Data Package

CSF: N

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ASSIGNED TO DATE IN DATE OUT

ADMIN DUE DATE: 09/20/94

DIV : EFED 06/22/94 / /

NEGOT DATE: / /

BRAN: EAGB / /

PROJ DATE: / /

SECT: SWB / /

REVR : / /

CONTR: N NELSON / /

* * * DATA REVIEW INSTRUCTIONS * * *

ATTN: HENRY NELSON

CHLORPYRIFOS PROTOCOL FOR RISK
MITIGATION. NOT A GUIDELINE STUDY
BUT REGISTRANT WANTS TO MITIGATE
RISK. THEY INTEND TO START
STUDY IN AUG. CAN WE LOOK AT
IT BEFORE STUDY COMMENCES ?

* * * DATA PACKAGE EVALUATION * * *

No evaluation is written for this data package

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

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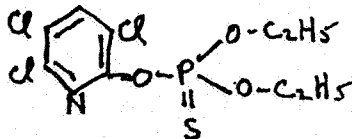
1. CHEMICAL:

Common Name: Chlorpyrifos

Chemical Name: O,O-diethyl-O-(3,5,6-trichloro-2-pyridyl) phosphorothioate

Type of Product: Insecticide

Chemical Structure:



Physical/Chemical Properties

Molecular Weight: 350.6

Aqueous Solubility: 2.0 mg/L @20°C

Vapor Pressure: 1.87×10^{-3} torr

Henry's Constant: 4.21×10^{-6} atm*m³/mol

Log K_{ow} = 4.70

2. TEST MATERIAL:

Lorsban 15G

3. STUDY/ACTION TYPE:

Review of a protocol for conducting a small plot runoff study to determine the effectiveness of 15 foot and 30 foot Vegetated Filter Strips (VFSS) in reducing chlorpyrifos runoff from agricultural fields.

4. STUDY IDENTIFICATION:

Poletika NN and Coody P. 1994. Proposed study protocol to evaluate chlorpyrifos surface runoff mitigated by vegetated filter strips. Submitted by DowElanco. Protocol No. ENV94029.

5. REVIEWED BY:

Henry Nelson, Ph.D., Head *H. Nelson*
Surface Water Section
Environmental Fate and Groundwater Branch/EFED

6. APPROVED BY:

Henry Jacoby, Chief
Environmental Fate and Groundwater Branch
Environmental Fate and Effects Division

7. BACKGROUND:

Under the new OPP procedures for conducting aquatic risk assessments, registrants are expected to help verify the effectiveness of proposed mitigation methods. The purpose of the proposed small plot runoff study is to determine the effectiveness of vegetated buffer strips (VFSS) in reducing chlorpyrifos runoff.

8. CONCLUSIONS:

Based upon an initial review by H. Nelson, and a subsequent discussion with D. Jones, S. Mostaghimi, and R. Parker, EFGWB has reached the following conclusions:

1) There are some aspects of the protocol (attached) that EFGWB believes are somewhat deficient, but some (see discussion) can probably not be addressed before the scheduled start of the study. Nevertheless, the registrant should consider those comments for any future runoff study protocols.

2) Despite some deficiencies, EFGWB believes that the proposed study will provide some useful information on the effectiveness of vegetated filter strips in reducing chlorpyrifos runoff.

3) One aspect that was unclear is whether or not both the post-plot flume and the post-VFS flume will be sampled. EFGWB believes that it is absolutely necessary for both to be sampled to determine the efficiency of the VFSs in reducing chlorpyrifos runoff. In a 8/3 phone conversation, the registrant indicated that both flumes would be sampled.

4) In a 8/3 conversation, the registrant agreed to discuss scaling in the study report. The SCS recommends a minimum width of 33 feet for VFSs. The 15 and 30 foot VFSs collecting runoff from a 150 foot long plot in reality represent 1:10 and 1:5 VFSs rather than their stated widths. For example, an adequate performance by a 15 foot VFS receiving runoff from a 150 foot long plot in this proposed study would not necessarily mean that it would be adequate for a 300 foot long plot, but might suggest that a 30 foot VFS would be adequate. However, the registrant indicated that at the experimental slopes of 4-5%, slope lengths greater than 150 feet would probably necessitate the use of more severe mitigation steps than VFSs such as terracing.

5) It was unclear from the protocol what type of samples will be frozen for shipping and/or storage and what type will be just chilled. In a 8/3 phone conversation, the registrant indicated that runoff samples collected from the flume will just be chilled instead of frozen due to problems with preparing and extracting such samples for analysis, but that such analyses will be performed within 30 days of sampling. EFGWB indicated that even with analysis within 30 days, they need to demonstrate with adequate spiking the shipping and storage stability of chilled samples.

6) Travel spikes can be a useful diagnostic tool. If spikes taken all the way through shipping and storage are unstable, travel spikes can indicate whether or not shipping contributed to the instability. However, it may be better to increase the number of field spikes rather than perform travel spikes. It was unclear from the protocol when and where the storage stability samples will be spiked. In a 8/3 phone conversation, the registrant indicated that storage stability samples will be spiked in the analyzing lab. Ideally, storage stability samples should be spiked in the field or at least prior to shipping so that they represent combination shipping and storage stability samples. The registrant agrees, but believes that spiking carried out by the analytical lab will be

more accurate than those carried out by the sample collectors. EFGWB agreed that the registrant needs some flexibility in these matters, but the registrant agreed to re-evaluate their QC sampling plan.

7) It was unclear from the study protocol, but in a 8/3 phone conversation, the registrant indicated that the VFSSs will be subjected to the same artificial rainfall as the plots.

8) In a 8/3 phone conversation, the registrant asked for guidance on the interval between artificial rainfall events and on the length of the VFS grass. EFGWB concurred with the 10-15 cm grass length proposed in the protocol. EFGWB agreed to give the registrant some flexibility on the time interval between rainfall events. Although some drying interval is necessary so that the soils won't be saturated or close to saturated just before the second rainfall event, EFGWB would like the soils to have substantial antecedent moisture and for the registrant to adequately determine such moisture prior to each rainfall event. The registrant indicated that the interval between artificial rainfall events would be relatively short due to concerns over actual rainfall events occurring within the interval.

9) Instead of collecting only one flow weighted composite sample from each flume after each runoff event, flow composited samples should be collected from each flume at several different times during each runoff event so that the efficiency of chlorpyrifos, sediment yield and runoff volume reduction can be determined as a function of time. Time dependent sampling is not important if the removal efficiencies remain high during the entire runoff event, but become crucial if removal efficiencies abruptly decline during a runoff event. In a 8/3 phone conversation, the registrant agreed that time dependent sampling would be of value in cases will breakthrough may occur, and indicated that they might be able to collect some time dependent samples during the more severe rainfall event on the plots with 15 foot VFSSs.

9. RECOMMENDATIONS:

Inform the registrant to proceed with the study taking into account the comments listed in the conclusion section. Also, inform the registrant to take into account comments in the discussion section in preparing any future protocols for runoff studies.

10. DISCUSSION:

EFGWB believes that the following aspects of the proposed study are somewhat deficient, but realizes that most can probably not be addressed before the scheduled start of the study in August 1994. However, the registrant should take these comments into consideration when preparing any future protocols for runoff studies.

1) As indicated in a 8/3 phone conversation with the registrant, EFGWB continues to be somewhat skeptical about re-distributing runoff uniformly across the top of VFSSs. EFGWB agrees that there are some advantages to such an approach including not having to run separate control plots with no VFSSs, reducing the variability between replicate plots, and improving knowledge about what is actually being applied to the VFSSs. However, EFGWB does not agree with the registrant that the elimination of concentrated flow across the filter strip is actually another advantage. Concentrated flows are what happens in the actual environment. For vegetated filter strips to be adequate, they need to be able to effectively handle concentrated as well as uniform flows. In addition, there may be some problems with matching the pumping rate onto the VFSSs with the actual flow rate at the bottom of the plot particularly since the flow rate at least initially varies with time.

2) EFGWB believes that instead of re-distributing runoff uniformly across the top of the VFS, that either:

(a) No-redistribution be done and that plowing should be down rather than across the slope. Although EFGWB realizes that plowing across the slope is much more prevalent than plowing down the slope, plowing down the slope would allow for greater distribution of concentrated flows down both the rows and the berms rather than just down the berms. Furthermore, in an actual field with plowing across the slope, concentrated flows generally occur at several different points at the VFS. Finally, for modeling purposes, down the slope plowing is more appropriate because USLE erosion factors were developed from plots with down the slope plowing.

(b) As suggested by R. Parker, re-distribution be done with plowing across the slope, but distribute the flow from three points on the header at a large flow rate rather than from many points at a low flow rate. This would retain many of the advantages of re-distribution but address EFGWB's concern about failing to determine the ability of VFSSs to handle concentrated flow.

3) EFGWB believes that studying a 15 foot and 30 foot VFS with only 2 replicates each is not a good study design. As indicated in our 8/3 conversation with the registrant, there should be a minimum of 3 replicates run for each width of VFS.

4) Exposing the same plots to successively more intense storms will probably minimize overall soil erosion while maximizing overall runoff volume due to sealing of the soil. That might be appropriate for studying the runoff of a pesticide with low soil/water partition for which runoff is primarily via dissolution in runoff water. However, it is probably not as appropriate for a pesticide with relatively high soil/water partitioning such as chlorpyrifos for which runoff may be primarily by adsorption to eroding soil.

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ROOM: CS1

2B3

PM TEAM REVIEWER: DENNIS MCNEILLY

703-308-8066

ROOM: CS1

3F5

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Dow Elanco
9350 Zionsville Road
Indianapolis, IN 46268-1054

308/3E
June 20, 1994



Document Processing Desk
Office of Pesticide Programs (H7504C)
U.S. Environmental Protection Agency
Room 266A, Crystal Mall 2
1921 Jefferson Davis Highway
Arlington, VA 22202

Attention: Dennis McNeilly (H7509C)

Re: Proposed Study Protocol to Evaluate Chlorpyrifos Surface Runoff Mitigated by Vegetated Filter Strips

Enclosed is a copy of the subject protocol for EPA review and comment. Of particular interest to DowElanco are Agency comments related to the following topics:

- Under Objectives, page 4, runoff event return frequencies of 1-in-2 and 1-in-5 to 1-in-10 years intended to evaluate VFS effectiveness under varying conditions.
- Under Plot Design, page 7, redistribution system for runoff to improve uniform sheet flow in the VFS.
- Under Plot Design, page 8, grass height in the VFS maintained at 10 to 15 cm.
- Under Rainfall Simulation, page 8, drying period between first and second storm simulations with no mechanical disturbance of treated soil.

Since there are no standard protocols or EPA guidelines for this type of study, I will follow up with a call to you to set up a meeting or conference call to further discuss the topics cited above as well as others that the EPA may have. In addition, as we plan to initiate this study in August, your urgent attention to this request is most appreciated.

Sincerely,

A handwritten signature in black ink that reads "Robert F. Bischoff".

Robert F. Bischoff
Product Registration Manager
U.S. Regulatory, Toxicology and
Environmental Affairs
(317) 337-4686

RFB/ge

cc: Dennis Edwards, (H7505C)

bcc: Nick Poletika, DowElanco
Ken Racke, DowElanco

Enclosures

8

Page _____ is not included in this copy.

Pages 89 through 34 are not included.

The material not included contains the following type of information:

- _____ Identity of product inert ingredients.
- _____ Identity of product impurities.
- _____ Description of the product manufacturing process.
- _____ Description of quality control procedures.
- _____ Identity of the source of product ingredients.
- _____ Sales or other commercial/financial information.
- _____ A draft product label.
- _____ The product confidential statement of formula.
- _____ Information about a pending registration action.
- ☒ _____ FIFRA registration data.
- _____ The document is a duplicate of page(s) _____.
- _____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.
