

US EPA ARCHIVE DOCUMENT



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

DP Barcode: 257682  
Case No: 046754  
Chemical: 123000 Isoxaflutole

MEMORANDUM

**Date:** August 4, 1999

**To:** Joanne Miller, PM-23  
Herbicide Branch  
Registration Division

**From:** Ian Kennedy, Ph.D., Hydrologist  
Environmental Risk Branch 2 *Ian Kennedy*  
Environmental Fate and Effects Division

Mike Davy, Agronomist *Michael Davy*  
Environmental Risk Branch 2  
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**Thru:** Pat Jennings, Acting Branch Chief *Pat Jennings* 8-5-99  
Environmental Risk Branch 2  
Environmental Fate and Effects Division

**Subject:** Comments to the Meeting Notes dated 7/8/99 with Rhone-Poulenc Ag Company  
Concerning Isoxaflutole Detailed Tile Drain Monitoring Studies and PGW  
studies.

The registrant for isoxaflutole, Rhone Poulenc Ag Company, has submitted their July 1, 1999 meeting notes with EFED regarding Prospective Groundwater Monitoring (PGW) studies and detailed tile drain studies. EFED has reviewed the meeting notes submitted by Rhone-Poulenc (R-P) on July 8, 1999. Our comments to the July 1 meeting notes are discussed below.

Please note that EFED previously commented on the experimental design for isoxaflutole tile drain water monitoring studies in a memo from David Wells, Hydrologist, to Daniel Kenny, dated January 11, 1999. We have attached a copy of that memo for your information.

## **I. Detailed Tile Drain Studies**

The detailed tile drain studies should be significantly more involved than the "grab" tile drain sample studies initiated by R-P this year. The detailed tile drain studies are considered PGW studies in which we are not requiring deep groundwater monitoring or deep characterization of the soil. Site Characterization for these studies should follow the PGW guidance, with the exception that the depth of the soil characterization to at least one foot below the bottom of the tile lines. We would also recommend double-ring infiltrometer measurements of surface soil hydraulic conductivity in conjunction with the typical hydraulic conductivity measurements specified in the PGW guidance document.

### **Comments on R-P's proposals for the detailed tile drain monitoring studies**

#### *1. Study Location*

R-P suggested conducting studies in Ohio and Indiana. These states seem reasonable, but Illinois, Iowa, Pennsylvania and New York might be considered acceptable as well.

#### *2. Site properties*

- a. A field size between 30 and 60 acres is acceptable.
- b. Two to three drain outlets would be best, depending on the layout of the field. In our March meeting with R-P, and in the site selection report for the simple tile drain monitoring study, Russell Jones suggested R-P could add drain outlets in some cases. This would be fine in cases where many tile lines feed one outlet. It would also be acceptable to conduct a single study on two adjacent fields with separate tile systems in order to study discharge from two outlets.
- c. EFED would recommend drain spacing of 50 ft or closer.
- d. EFED would recommend soils with organic matter content less than 5%.
- e. In cases where the land surface slope is greater than 2%, we recommend surface runoff monitoring studies. These monitoring studies could evaluate only a fraction of the field, but should continuously monitor runoff volumes and should take samples of the any runoff generated by natural or artificial rainfall events.
- f. With respect to the water table depth and tile flow duration, we agree the depth to the permanent water table is less important but the tile lines should flow for the maximum duration normally observed. The literature review submitted by Kladvivko et al., 1999 to ACPA indicates most tile drains flow from September through June in a normal rainfall year (flow may stop when the soil is frozen).
- g. Soil textures can be finer (e.g., silt loam, silty clay loam, etc.) than for a PGW

study; however, the saturated hydraulic conductivity measurements should not indicate restrictive layers above the tile line. Any restrictive layers should occur below the level of the tile lines.

- h. We agree with R-P's proposed requirement that drains have been installed for at least three years before the start of the study and are functioning properly.
- i. EFED recommends that the majority of the sites for these studies use established no-tillage agricultural cropping practices.

### **Tracer**

A reduction in the amount of tracer may be acceptable, but we would need to see the results of the simple "grab sample" tile drain monitoring study before making a final decision on this issue.

### **Application Sampling**

Confirmation of the application rate by sampling with filter paper is acceptable and meets the PGW guidance.

### **Post Application Sampling**

The sampling schedule proposed by R-P is inadequate. Sampling should be event-driven with flow proportional sampling at frequency greater than once per day throughout the early stages of the study. We recommend twice as many samples be taken as will be analyzed. The remaining samples should be stored appropriately and tested only if they were taken during periods of rapid fluctuation in tile discharge concentration.

Samples of soil and soil pore water should be taken in accordance with PGW guidance.

### **Weather monitoring**

A weather station capable of recording hourly air and soil temperature, wind speed, pan evaporation and precipitation is recommended for each site.

## **II. PGW Studies**

The PGW site selection reports should include preliminary site characterization data for each site, including 3 hand drilled soil cores to 4 feet depth, texture, organic matter percentage and Ksat. EFED recommends double-ring infiltrometer measurements of hydraulic conductivity at any proposed PGW sites. We agree that the Klum soil in NE Missouri is a good possibility for a PGW study.

If you have any questions, contact Ian Kennedy at 308-2804.

DP Barcode: D252111  
Case No: 046754  
Chemical: 123000 Isoxaflutole

January 11, 1999

MEMORANDUM:

SUBJECT: Isoxaflutole Tile Drain Water Monitoring Study

TO: Daniel Kenny, PM Team Reviewer  
Registration Division (7505C)

FROM: David Wells, Hydrologist  
Environmental Risk Branch II

Thru Betsy Grim, Acting Chief  
Environmental Risk Branch II  
Environmental Fate and Effects Division (7507C)

“Balance” (Isoxaflutole) is a newly registered low application rate corn herbicide. Review of laboratory and field studies has concluded that isoxaflutole (and its degradates) are mobile and persistent. OPP is concerned that isoxaflutole residues could reach ground or surface water which is used as a source of irrigation and affect non-target crops or the environment. Rhone-Poulenc submitted a protocol for a Tile Drain Water Monitoring field study to support this new registration. This study is intended to measure isoxaflutole residues in water draining from a tiled corn field where it has recently been applied.

This protocol was received informally through E-mail along with the protocols for the isoxaflutole small-scale ground water monitoring studies. As of this date, we have not received a final copy of this protocol through the proper channels.

This document is the result of a review by OPP’s Water Quality Tech. Team (WQTT) and represents the review and comments from eight EFED scientists.

Summary: This protocol was found to be too general, somewhat inconsistent and needs to be “tightened up.” Site characterization data for the proposed sites is critical and needs to be submitted. EFED has proposed major changes. These include increasing the number of study sites, the use of rainfall simulators, using a tracer, significant changes in the proposed sampling

schedule, collection of water flow data, and gathering other on site information. The protocol is not acceptable as it currently stands.

#### Discussion:

It is not clear from the protocol if this study is intended to represent the tightly controlled tile drain monitoring study or the tile drain "grab" samples that were discussed during the registration process.

There is currently no standard process or guidelines in EPA for conducting a tile drain study of this type. We would like to suggest that it follow a process similar to OPP's Pesticide in Ground Water (PGW) studies. The order of this would be:

- site selection
- site characterization
- development of a monitoring program
- implementing a monitoring program

Using this approach, the reports should also be similar to the PGW studies.

This protocol only focuses on the development of a monitoring plan and does not provide any site specific information. A single study location will not be sufficient to determine how tile drains will impact the movement of isoxaflutole in the environment. A minimum of 2-4 study sites should be tested. We had previously discussed selecting study sites that are representative or typical of corn production in the Midwest or Plains states. The protocol discusses that standard or local agronomic practices would be used. An alternative to using the typical EPA study approach would be to work with the universities and conduct the studies at preexisting research sites.

Generally we agreed that these studies would be one growing season in length, however droughty conditions, lack of discharge from the drains, or similar problems with the water balance could necessitate extending the sampling period past the end of the growing season.

A critical deficiency in most of the proposed isoxaflutole field studies has been the lack of irrigation or rainfall simulators. For a full tile drain study, rainfall simulators are needed! Test plots can be designed with metal borders to minimize surface water runoff and maximize infiltration.

The studies should also use a conservative tracer to better account for the movement of the water in/on the field. Bromide or chloride tracers would be appropriate and could be applied with the test compound. Background measurements for the tracer anion will need to be taken from the drain discharge, the ditch and the stream prior to commencement of the study. Also if irrigation water is applied to the plot, samples should also be taken of this water.

A critical part of this study will be the site characterization which should include a detailed soil characterization. The soil morphology at the test site should be described to accurately document the potential flow paths. Also field measurements or estimates of infiltration rates and saturated hydraulic conductivity are needed. Soil water content should be measured weekly to document the field soil water regime.

It is not clear in the protocol what sample collection system will be used for collecting the daily water samples. The protocol also does not indicate whether all the samples will be analyzed. Daily sample analysis alone is not of great value. The samples need to be related to water volumes and flow rates need to be measured in the drain, ditch and stream. With the limited field size of 2 acres, the study director should be able to capture information on the water volume. An automated water flow monitoring device and sampler is recommended. An automated sampler that "kicks-in" when the flow increases would provide event driven data. Another method would be to base the sampling on the breakthrough of the tracer. This approach might not be as practical depending upon the "turn around time" for the lab to analyze for the tracer and get the results back to the field sampler.

For this tile drain study, we concluded that lysimeters were not needed to sample the soil pore water. We are however asking for weekly measurements of the soil moisture content.

Most tile drain spacing is a maximum of 80 feet apart so it is better to monitor individual tile drains and not just the main collector if possible. The layout and history of the field drain system should be documented. An accurate map of the existing tile drain system should be included with the site characterization information. Diagrams of the specific plots should also include information showing the topography. Historical and field management practices should also be recorded including information on other chemicals and fertilizers applied to the study plots. Data on solar radiation and wind should also be collected for use in any potential modeling.

The document should be clearer about which compounds will be analyzed for in the study. In part "B" under the discussion of the "Study Reference Substance (Analytical Standard) Identification" the analytes are named, however in many parts of the protocol it appears that only parent isoxaflutole is being analyzed for. The study should use an EPA approved method of analysis. The protocol states the method is still under development and when finalized will be referenced in an amendment and included in the final report.

This protocol was also reviewed by OPP's Quality Assurance representative who provided several comments and questions. (Section I- Field part L) For the field fortification of the analytes, is the distilled water or field water spiked? (Section II -Part D - Subpart 2) Where does the control water comes from? Also the term "control sample" should be called a reagent blank. The final report should also include control charts of the recovery samples.

Summary

This protocol was found to be too general, somewhat inconsistent and needs to be "tightened up." Site characterization data for the proposed sites will need to be submitted. EFED has proposed major changes including the use of rainfall simulators, use of a tracer, significant changes in the proposed sampling schedule, collection of water flow data, and gathering other on site information.