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SHAUGHNESSEY NO. REVIEW NO.

EEB REVIEW

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TYPE PRODUCT(S) : I, D, H, F, N, R, S Insecticide

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. W. Miller (16)

PRODUCT NAME(S) Methamidophos

COMPANY NAME Chevron Chemical Co.

SUBMISSION PURPOSE Residue Monitoring Protocol (Potatoes)

SHAUGHNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.

CHEMICAL NAME: METHAMIDIPHOS

100.0 Submission Purpose

The Registrant has submitted a residue monitoring study in potatoes to assess exposure to avian species under standard agricultural use patterns. The protocol for the study was submitted to satisfy the terrestrial field studies data requirement for the Registration Standard.

101.0 Protocol Review and Evaluation

See Attached

102.0 Summary

The EEB has reviewed the proposed field residue monitoring study and has determined that it is inadequate to develop a typical residue profile which could be used in a hazard assessment. The EEB suggests that the comments made in this review, relative to how the protocol can be improved, be incorporated into the study design. The EEB also suggests that the Registrant contact this office prior to initiation of the study.

Richard Felthousen, Wildlife Biologist
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PROTOCOL REVIEW

Title: Monitor 4 Spray: A Residue Monitoring Study In Potatoe Fields To Assess Exposure To Avian Species Under Standard Agricultural Use Patterns.

Contract Lab: Wildlife International, Ltd.

Study Director: Mr. Hank Krueger

Date: February 16, 1987

Type of Study: Single season field residue monitoring study.

Objective: To access avian exposure under standard agricultural conditions.

Study Location: Bingham county, Idaho

Experimental Design:

The design calls for two treated plots but no control plots. Study plots will range in size from 35-150 acres. Both study plots are center pivot irrigated. Samples will be collected 1 day prior to and 1 and 3 days after the first application. Samples will also be collected 1,3,7,14 and 28 days after the second application. Residue sampling will not occur until spray particles have completely dried and reentry is considered safe.

There will be a total of 15 sample stations/treated field; 3 stations on the interior of each field, 6 stations in the field edges and 6 stations located in the same manner but on the downwind side of the treatment area and perpendicular to the flight lines. Residue sampling procedures are shown in Table 1. All samples will be analyzed with the analytical procedures provided by the sponsor.

Spray deposition cards will be monitored during each application. Cards will be monitored approximately 0.25 m above the vegetation canopy. Collection of spray cards will be initiated after deposits have dried.

Monitor 4 spray will be aerially applied at a rate of 2 pints (1.0 lb. ai) per acre. A total of 2 applications at 7 day intervals will be made starting in late July or early August.

Meteorlogical conditions such as wind speed; humidity, temperature and precipitation will be measured at the time of each application.

PROTOCOL EVALUATION

The protocol was evaluated as to whether or not it would provide sufficient data to develop a typical residue profile which could be used in a risk assessment. Because these data will play an important role in subsequent risk assessments, it is imperative that the study design be adequate enough to provide a comprehensive exposure profile for non-target wildlife species.

Residue Sample Collection:

Residue samples should be collected immediately after application and not 1 day post-treatment. If reentry poses a safety problem, researchers should wear protective clothing while collecting samples. It must be remembered that the highest residues, and probably the greatest hazard to wildlife, will generally occur within a very short time (usually within a few hours) after application before biotic and abiotic factors can reduce exposure levels.

Residue Collection Stations and Number of Samples:

Non-treatment Area

It would appear that there are sufficient number of sample stations placed throughout the non-treated areas to provide a good cross-section of residue patterns. It also appears that there are sufficient replicates, conducted at appropriate intervals, and enough sample material collected to obtain good data. However, because of compositing, there does not appear to be sufficient number of samples to determine the typical variation associated with treatment. The EEB believes that the practice of compositing samples tends to "mask" the typical variation that occurs on both the treated and untreated areas. Therefore, the EEB recommends that each sample be independently analyzed and reported. If samples are composited, the mean and standard deviation must be reported. The EEB cautions that such data may not be "weighed" as heavily as data derived from independent samples and that the upper confidence limits will most likely be used in a risk assessment.

Treatment Area

There are insufficient number of sample stations, in the treated area to provide a good cross-section of residue patterns. In addition, because of compositing, there are insufficient number of samples to determine the typical variation in residue levels. The EEB suggests that a minimum of 6 sample stations be established on the treated area and that each sample be analyzed and reported. If samples are compositied, the mean and standard deviation must be reported. The EEB notes that unless the sample size is increased (it appears that after compositing there is only one sample for soil and water) it may not be possible to establish upper and lower confidence limits around the sample mean.

Residue Collection Timing

Toxicological data suggests that many OP's are dermally toxic and tend to pose a greater hazard to avian and mammalian species when applied immediatley after a rainfall or after irrigation. Therefore, the EEB recommends that at least one of the treatment areas be irrigated prior to application (The EEB believes that under certain conditions it is standard agricultural practice to apply a pesticide immediately after a rain storm or after a field has been irrigated). This would also insure that sufficient water samples could be taken rather than depending on the random chance that water will be present to sample. The study must be designed to get sufficient number of replicates for this aspect of residue collection.

Reporting Meteorlogical Conditions

Complete meteorlogical records should be kept from the onset of the study not just at the time of application. It is important to record pre-treatment as well as post-treatment weather conditions.

Analysis of Residue Samples

A complete report on the analytical methods, including calibration standards, must be submitted to the Environmental Assessment Branch for review. In addition, it is recommended that, as a quality control check, random samples be sent to another lab, other than the sponsors, for analysis.

The EEB notes that the use of core samples to determine soil residues may not be appropriate. The EEB suggests that soil samples be taken from only the top 1 inch of the soil surface to determine typical residues levels that soil organisms, as well as those non-targets that feed on such organisms, will be exposed to.

Table 1

Estimated Residue Samples to be Collected

Sample Matrix	Area Sampled	Amount of Material/ Composite[1]	Number of Stations	Number of Stations/ Composite	Number of Samples	Number of Sampling Intervals	Total Number
Soil	Treatment 1 - Field	500 g	3	3	1	8	8
	Treatment 1 - Surrounding Habitat	500 g	12	3	4	8	32
	Treatment 2 - Field	500 g	3	3	1	8	8
	Treatment 2 - Surrounding Habitat	500 g	12	3	4	8	32
Water[2]	Treatment 1 - Field	1 liter	3	3	1	8	8
	Treatment 2 - Surrounding Habitat	1 liter	12	3	4	8	32
	Treatment 2 - Field	1 liter	3	3	1	8	8
	Treatment 2 - Surrounding Habitat	1 liter	12	3	4	8	32
Target Crop Vegetation	Treatment 1 - Crop Foliage	150 g	3	1	3	8	24
	Treatment 2 - Crop Foliage	150 g	3	1	3	8	24
Non-Target[3] Crop Vegetation	Treatment 1 - Field	150 g	3	3	2	8	16
	Treatment 1 - Surrounding Habitat	150 g	12	3	8	8	64
	Treatment 2 - Field	150 g	3	3	2	8	16
	Treatment 2 - Surrounding Habitat	150 g	12	3	8	8	64
Inverte-[4] brates	Treatment 1 - Field	50 g	3	3	2	8	16
	Treatment 1 - Surrounding Habitat	50 g	12	3	8	8	64
	Treatment 2 - Field	50 g	3	3	2	8	16
	Treatment 2 - Surrounding Habitat	50 g	12	3	8	8	64
Mammals and Birds	When found						
Spray Deposition	Treatment 1		15	1	15	2	30
	Treatment 2		15	1	15	2	30
TOTALS					96		588

1 Subject to change based on analytical detection limits.
2 Dependent on presence of water source(s).
3 Assumes two separate matrices (seeds, fruits and inflorescences; and foliage, stems and roots).
4 Collected when sufficient numbers of invertebrates are available. Invertebrates will be divided into two groups.

Figure 1. Location of the Study Fields
in Bingham County, Idaho

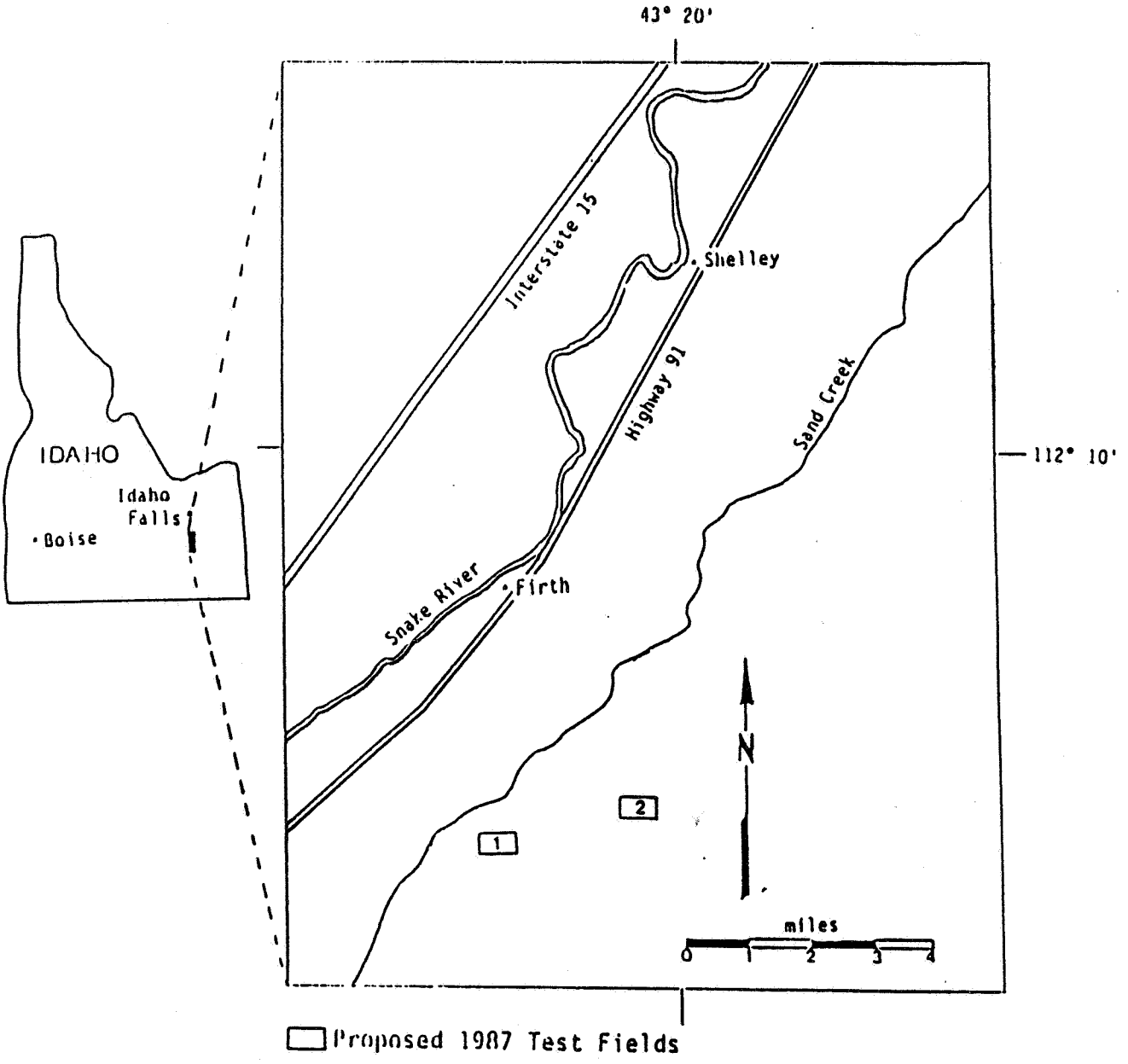
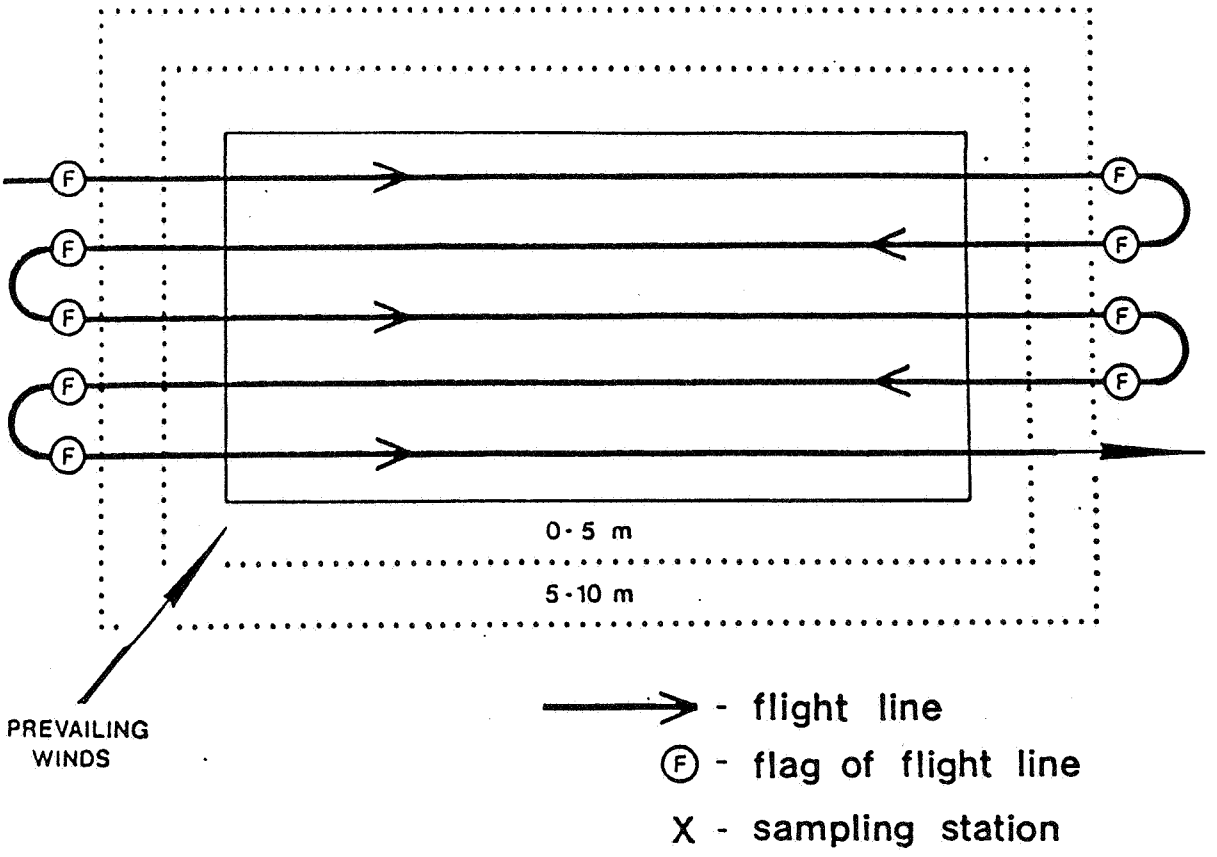
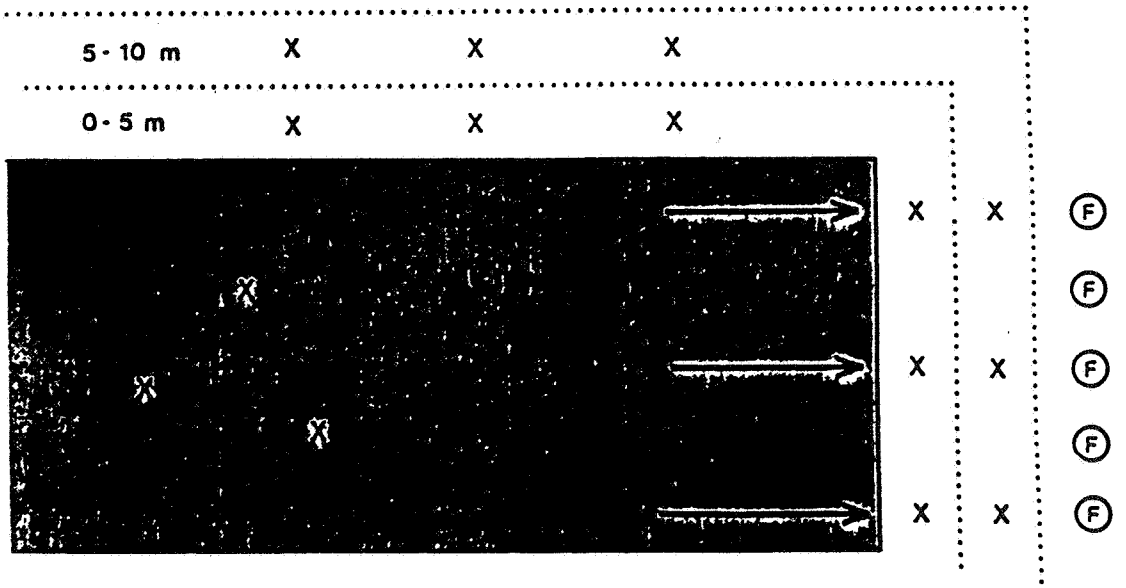


Figure 2. Diagramatic representation of A) flight lines on a test field, and B) sampling stations on and around a test field.

A)



B)



12-2-89

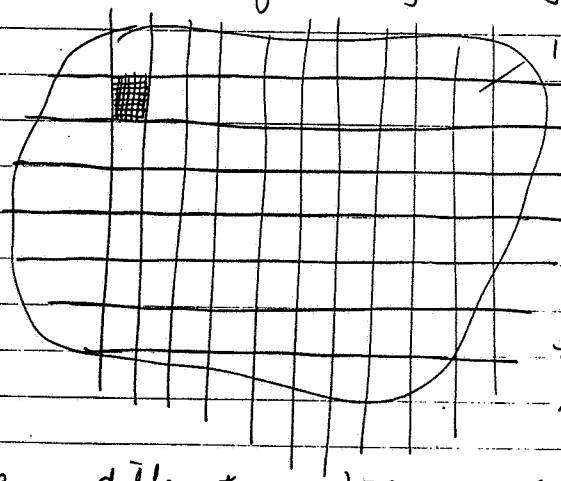
Dick:

Here are some additional points to consider:

1. Page 4

(a) If winds are low and variable, it will have been difficult to predict exactly where the "cloud" drifted. I have seen an instance where drift has moved "upwind" according to the prevailing wind direction. This problem lends support to locating more sample stations well within the field to be sure to get "hot spots".

(b) Further, they must develop a method to randomly select sample stations within the treated field. A stratified block design would be preferable to reduce the likelihood that 2 or more sites from being adjacent.



1 acre squares which, once selected (randomly) are subdivided into sample station size plots and one of these is randomly selected.

a different 1-acre square is chosen for each sample station

(c) It looks to me like they are proposing only 3 "in field" stations, see also page 14, Figure 2. B. Since they propose to composite samples within stations, at least 5 or 6 stations are preferable.

2. Page 5

Do you see any merit in requiring them to analyze leaves and stalks separately? It seems that, with their bulk, stems or stalks will have lower apparent residues with equal surface deposits. Leaves may have greater residues in ppm with same surface deposit. There certainly should be no problem in collecting sufficient ~~material for~~ amounts of both types. This also applies to rangeland plant material also.

Again, interstation compositing is acceptable if there are more stations

3. ~~Page 6~~ Pap

~~If possible, leaves and stalks of~~

3. Page 6

In thinking about techniques for collecting soil invertebrates, I would think soil corers would be least preferable. The techniques that cause the worms, etc. to crawl through the soil to the surface would be preferable. That way they come into more contact with contaminated soil and it would more closely simulate ~~those~~ the conditions that would occur when a bird was feeding. I.E. they would feed on invertebrates at or close to the surface. If soil is dug and screened to collect samples, it should be skimmed ~~off~~ from the top 1 inch or less.

D. Rider