

US EPA ARCHIVE DOCUMENT

DP Barcode : 175927  
 PC Code No. : 090301  
 EFGWB Out : DEC 07 1992

TO: Linda Propst  
 Product Manager # 73  
 Special Review and Reregistration Division (H7508W)

FROM: Elizabeth Behl, Head  
 Ground Water Technology Section  
 Environmental Fate & Ground Water Branch/EFED (H7507C)

THRU: Henry Jacoby, Chief  
 Environmental Fate & Ground Water Branch/EFED (H7507C)

*Debra Ward for EB.*  
*Henry Jacoby*

Attached, please find the EFGWB review of...

Reg./File # : \_\_\_\_\_

Common Name : Methomyl

Product Name : Lannate

Company Name : Du Pont

Purpose : Review protocol and amendments for small-scale prospective monitoring study.

Type Product : Insecticide

Action Code : 635 EFGWB #(s): 92-0970, 92-0658 Total Review Time = 10 days

EFGWB Guideline/MRID/Status Summary Table: The review in this package contains...

161-1	162-4	164-4	166-1 Protocol	P
161-2	163-1	164-5	166-2	
161-3	163-2	165-1	166-3	
161-4	163-3	165-2	167-1	
162-1	164-1	165-3	167-2	
162-2	164-2	165-4	201-1	
162-3	164-3	165-5	202-1	

Y = Acceptable (Study satisfied the Guideline)/Concur P = Partial (Study partially satisfied the Guideline, but additional information is still needed)  
 S = Supplemental (Study provided useful information, but Guideline was not satisfied) N = Unacceptable (Study was rejected)/Non-Concur

DP BARCODE: D175927

REREG CASE #

CASE: 819319  
SUBMISSION: 5414440

DATA PACKAGE RECORD  
BEAN SHEET

DATE: 03/20/92  
Page 1 of 1

\*\*\* CASE/SUBMISSION INFORMATION \*\*\*

CASE TYPE: REREGISTRATION ACTION: 635 PROPOSED TEST PROT SUBM  
CHEMICALS: 090301 Methomyl ( S-methyl N-((methylcarbamoyl)oxy)thioac 100.00 %

ID#: 090301

COMPANY:

PRODUCT MANAGER: 72 LARRY SCHNAUBELT 703-308-8058 ROOM: CS1 3C3

PM TEAM REVIEWER: LARRY SCHNAUBELT 703-308-8058 ROOM: CS1 3C3

RECEIVED DATE: 03/12/92 DUE OUT DATE: 06/20/92

\*\*\* DATA PACKAGE INFORMATION \*\*\*

DP BARCODE: 175927 EXPEDITE: N DATE SENT: 03/20/92 DATE RET.: / /  
CHEMICAL: 090301 Methomyl ( S-methyl N-((methylcarbamoyl)oxy)thioacetimidate

DP TYPE: 001 Submission Related Data Package

ADMIN DUE DATE: 06/18/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	03/24/92	/ /
BRAN: EFGB	/ /	/ /
SECT:	3 25/92	/ /
REVR : Waldman	/ /	12/3/92
CONTR:	/ /	/ /

\*\*\* DATA REVIEW INSTRUCTIONS \*\*\*

For the attached reregistration case, please identify all applicable data requirements and note those for which adequate data have not been submitted to the Agency.

635 - PROTOCOL FOR GROUNDWATER  
MONITORING - I WILL BE  
REQUESTING EXPEDITE

JEDWARDS (LSCHNAUBELT)

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

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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2

DP BARCODE: D178801

REREG CASE #

CASE: 819319  
SUBMISSION: S418705

DATA PACKAGE RECORD  
BEAN SHEET

DATE: 06/02/92  
Page 1 of 1

\*\*\* CASE/SUBMISSION INFORMATION \*\*\*

CASE TYPE: REREGISTRATION ACTION: 635 PROPOSED TEST PROT SUBM  
CHEMICALS: 090301 Methyl N-((methylcarbamoyl)oxy)thioacetimidate 100.00 %

ID#: 090301

COMPANY:

PRODUCT MANAGER: 73 LINDA PROPST 703-308-8165 ROOM: CS1 2L5  
PM TEAM REVIEWER: SUSAN CERRELLI 703-308-8077 ROOM: CS1 2D5  
RECEIVED DATE: 05/21/92 DUE OUT DATE: 08/29/92

\*\*\* DATA PACKAGE INFORMATION \*\*\*

DP BARCODE: 178801 EXPEDITE: N DATE SENT: 06/02/92 DATE RET.: / /  
CHEMICAL: 090301 Methyl N-((methylcarbamoyl)oxy)thioacetimidate  
DP TYPE: 001 Submission Related Data Package  
ADMIN DUE DATE: 08/31/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	06/09/92	/ /
BRAN: EFGB	/ /	/ /
SECT:	/ /	/ /
REVR :	/ /	12/3/92
CONTR:	/ /	/ /

\*\*\* DATA REVIEW INSTRUCTIONS \*\*\*

For the attached reregistration case, please identify all applicable data requirements and note those for which adequate data have not been submitted to the Agency.

TO BETSY BEHL - THIS IS  
AN AMENDMENT TO PROTOCOL  
YOU HAVE - DP BARCODE  
"D175927"

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

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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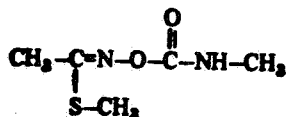
1. CHEMICAL:

Chemical name: S-Methyl-N-[(methylcarbamoyl)oxy]-thioacetimidate

Common name: Methomyl

Trade name(s): Lannate, Nudrin (discontinued)

Structure:



2. TEST MATERIAL:

Not Applicable.

3. STUDY/ACTION TYPE:

Review protocol and protocol amendments for small-scale prospective monitoring study.

4. STUDY IDENTIFICATION:

Title: Study Protocol - A Small-Scale Prospective Ground-Water Monitoring Study for Methomyl

Title: Submission of Protocol Amendment for the Ground Water Monitoring Study

Sponsor: E.I. Du Pont de Nemours & Company  
Agricultural Products Department  
Wilmington, DE 19880-0402

DP Barcode(s): 175927; 178801  
Identification Number: 090301  
Date Sent to EFED: 3/24/92; 6/4/92

5. REVIEWED BY:

Estella Waldman  
Hydrologist  
OPP/EFED/EFGWB/Ground-Water Section

Signature: Estella Waldman

Date: 12/1/92

6. APPROVED BY:

Elizabeth Behl  
Acting Section Head  
OPP/EFED/EFGWB/Ground-Water Section

Signature: E. A. Wells for EB

Date: 12/2/92

## **7. CONCLUSIONS:**

A protocol and protocol amendments for a small-scale prospective ground-water monitoring study for methomyl were reviewed. The protocol and amendments are not acceptable in their present form. Changes are stated in the "Recommendations" portion of this review.

## **8. RECOMMENDATIONS:**

The following revisions to the protocol are recommended:

1) Site selection information should be submitted to the Agency as soon as possible. The registrant should also submit methomyl use information to justify conducting the monitoring study on sweet corn. This information was discussed in a meeting held between the registrant and EFGWB on April 28, 1992 but should be formally submitted.

2) The site selection report should also indicate the source of the irrigation water for the study.

3) There is a significant difference between the 30-year average monthly precipitation and the average annual precipitation. The registrant should determine the difference in the amounts of irrigation water that would be applied under two scenarios:

- ◆ the 30-year monthly average, and
- ◆ the annual average proposed in the protocol amendment.

This information should be submitted as soon as possible. The registrant should submit brief quarterly progress reports to the Agency.

4) The locations of the monitoring wells on the study site are still unacceptable. As soon as possible, EFGWB would like to see an "as built" site map which indicates how the field was instrumented.

5) Proposed detection limits are stated in the letter from Charles S. Baer to Joanne Edwards (3/11/92). In water, quantitation was stated to be 0.1 ppb with a minimum detection limit of either "0.05 ppb or 1 ppb". The registrant should clarify which MDL is to be used in the analysis of water samples.

6) The registrant should be aware that compositing schemes for soil may invalidate a study.

7) The ground-water monitoring guidelines require standardized depths for soil sampling throughout the study. The protocol should be revised to reflect these standardized depths.

8) Soil-pore water samples should not be composited unless absolutely necessary because of insufficient sample volume.

9) Water-sample volumes collected from each suction lysimeter and ground-water monitoring well should be measured, recorded, and reported for each sampling event.

10) The protocol states that monitoring well screens with 0.10 - 0.20 slots will be installed. The standard slot size accepted by EPA for monitoring well screens is 0.01 - 0.02, and it is recommended that this slot size be used in the monitoring wells.

## 9. BACKGROUND:

Methomyl is the common name for S-methyl N-[(methylcarbamoyl)oxy]-thioacetimidate. It is marketed under the trade name Lannate (a former trade name, Nudrin, has been discontinued).

Methomyl is a broad-spectrum insecticide registered to control a variety of pests on agricultural and ornamental crops. According to the Pesticide Registration Standard (4/89) approximately 80% of methomyl use is on soybeans, peanuts, cotton, tobacco, and corn. The remaining 20% is formulated into products that are used on a variety of vegetables, fruits, field crops, and commercial ornamentals.

Methomyl is formulated primarily into a water-soluble powder (90% a.i.) and water-soluble liquids (1.8 and 2.4 lb a.i./gallon). Other registered formulations include dusts and granulars (1-5% a.i.), baits (1-2% a.i.), and ready-to-use liquids (1%). All soluble concentrates not in water soluble bags and baits (except 1% fly bait) are restricted-use pesticides registered for sale to and use only by certified applicators or persons under direct supervision.

The liquid and solid soluble concentrates are diluted with water and applied as a foliar treatment after the insects first appear. Methomyl is applied by aircraft (fixed-wing and helicopter); ground equipment, including airblast sprayers, and hydraulic sprayers with a single wand (gun) or boom; and others. The type of equipment is determined by the site and equipment availability.

Methomyl is moderately persistent in soils, but the persistence appears to be tied to the soil condition, and especially pH. The aerobic soil metabolism half-life ranges from 15 to 45 days; the anaerobic soil metabolism half-life is approximately eight days; field dissipation half-life ranges up to 45 days. Methomyl is stable to hydrolysis at pH's 4, 5, and 7; hydrolysis is rapid under alkaline conditions. The photolysis half-life in water is 1 day; in a silty clay loam, photolysis was 34 days. Supplemental data indicate that the Kads for methomyl range from 0.23 to 1.4 (one-liner database); a Koc of 72 was assigned by USDA, indicating that the compound is highly mobile.

Methomyl degrades to unextractable bound residues, carbon dioxide, and minor amounts of extractable residues (S-methyl-N-hydroxythioacetimidate). The extractable residues are not expected to form in amounts that pose a threat to ground water (EAB #80979, 10/31/88).

The Health Advisory for methomyl is 200 g/L, and it is listed in Cancer Group D (EPA, 4/91). The health effects associated with acute and subchronic exposure to methomyl are primarily due to cholinesterase inhibition (EPA, ODWHA, 1989). According to the Registration Standard for methomyl (4/89), technical methomyl is highly toxic to laboratory mammals by the oral route of exposure. It is also a pulmonary irritant. Chronic feeding studies on rats and dogs show dose-related histopathology effects on kidney and spleen. Methomyl was not found to be oncogenic in rats or mice. Methomyl may have an adverse affect on fish, other aquatic organisms, and birds but the impact is not known.

Methomyl and its degradate, S-methyl-N-hydroxythioacetimidate, were found to be very mobile under laboratory conditions. In order to resolve the environmental fate and movement of methomyl, a ground-water monitoring study was requested (memo from Stephen J. Simko to Dennis Edwards, November 9, 1987). In a later memo from Catherine A. Eiden to Dennis Edwards (EAB # 80979; 10/31/88), it was stated that methomyl was capable of leaching to ground water in very sensitive environments. The need for a ground-water monitoring study was again stressed in this memo. A small-scale retrospective ground-water monitoring study was requested to fulfill the monitoring requirement. In October 1991, the registrant committed to conducting a small-scale prospective monitoring study. A protocol for the study was submitted by the registrant and is critiqued in this review.

The "Pesticides in Ground Water Database" (1988 and 1992) indicates detections of methomyl in five states including Florida, Georgia, Missouri, New York, and New Jersey. Methomyl was detected in ground water at concentrations ranging from trace levels to 20 ppb (10% HA).

#### 10. DISCUSSION:

A small-scale prospective study is being conducted to monitor the environmental fate of methomyl under "worst-case" conditions. The compound will be applied under normal agricultural practices for sweet corn using proposed label directions at a maximum use rate.

#### SITE SELECTION:

A site for the methomyl study is proposed in Cook County, Georgia in the Southern Atlantic Coastal Plain region of the United States. The study is to be conducted on a 2 - 5 acre plot cropped in sweet corn with no prior use of methomyl. According to information presented by the registrant at a meeting in April 1992, the site has the following characteristics:

- no prior methomyl usage,
- topographic slope of  $\leq 2$  percent,
- water table at approximately 12 feet,
- cropland that has been in production for several years,
- low soil organic matter content (soil characterization borings indicate a range from 0.2 - 0.7%),



- no restrictive layers between the surface and the water table,
- nearby ground-water sources for irrigation, and
- soils that are homogeneous or texturally equivalent (soil on the site has been classified as the Kershaw Sand with sand content ranging from 92 - 96%).

The contractor will also document the history of agricultural chemical use on the site, the irrigation history, the land use history, the locations of potential point-source mixing areas, and the locations of existing wells in relation to the site.

Comments:

This portion of the protocol is acceptable. A site selection report including this information should be submitted to the Agency as soon as possible.

TEST SITE CHARACTERIZATION:

Test site characterization will include the collection of soil samples from deep soil borings (to the water table), installation of piezometers, slug tests to determine the saturated hydraulic conductivity of the aquifer, and field hydraulic conductivity tests using a Guelph permeameter and the "Richards" analysis. The soil characterization samples will be in 6-inch depth increments for the first five feet followed by 1-foot increments to the water table.

Comments:


This portion of the protocol is acceptable. A site selection report should be submitted to the Agency as soon as possible.

SITE DESIGN:

The test site will be a 3 - 5 acre area defined by the placement of piezometers at the site corners. An area of approximately two acres will be designated as the treatment area within the test site. The treatment area will be divided into three subplots of equal area, designated as A, B, and C. A buffer zone of at least six feet will be established around the inside periphery of the treatment area. No soil samples (residue or tracer) will be collected from the buffer area. A control area of approximately 0.5 acres will be situated upgradient (with respect to ground-water flow) of the treatment area.

Comments:

This portion of the protocol is acceptable.



### Monitoring Wells:

In the original protocol, the registrant proposed the installation of "at least" nine monitoring wells (four clusters of two wells and one additional well in the control area) for the study. Initially, the well clusters were to be placed within the buffer zone surrounding the field, and within 3 - 5 feet of the treatment area (Figure 1). After a discussion between the registrant and EFGWB, the registrant agreed to change the well locations.

Historical water-level records over a minimum of 10 years will be obtained from observation wells located near the site in order to determine the position of the well screens. If seasonal water-level fluctuations are determined to be greater than 10 feet, a third deeper well will be installed at each well cluster.

### Comments:

The portion of the protocol that concerns screen locations is acceptable. However, the locations of the monitoring wells are still unacceptable (Figure 2). The ground-water monitoring guidelines for small-scale prospective studies require that the monitoring wells for the study be located on the site. Monitoring well clusters should be constructed in a pre-established triangular pattern on the site, with one well upgradient well and two downgradient wells with respect to ground-water flow. During the meeting with EFGWB and Du Pont earlier this year, these items were discussed and it was agreed that two clusters would be placed upgradient, and two clusters would be located downgradient with respect to ground-water flow.

The site map provided by the registrant illustrates a scenario where one well cluster is upgradient, two clusters are "midgradient" and towards the northern and southern edges of the field, and one cluster is downgradient. The downgradient cluster, however, is located at the edge of the field and immediately downgradient (with respect to ground-water flow) of a dedicated walkway. Assuming that the walkway is used as a path for the sampling tractor, and by all people who walk on the field, the soil in the walkway will undoubtedly become compacted. Considering the location of the pathway, i.e., directly along the line of ground-water flow to the well cluster, a true representation of the flow may not result.

As soon as possible, EFGWB would like to see an "as built" site map which indicates how the field was instrumented. It was also noted that both Figures 1 and 2 were drafted on the same date. EFGWB wonders if this was a simple oversight or the replacement of one possible plan with another already in house.

The protocol states that well screens with 0.10 - 0.20 slots will be installed. The standard slot size accepted by EPA for monitoring well screens is 0.01 - 0.02.

#### Suction Lysimeters:

The protocol proposes the installation of 16 suction lysimeters on the site. Twelve samplers (four samplers in three clusters) will be installed in the treatment area; four samplers will be installed in the control area. Each cluster will consist of four samplers installed at depths of approximately 3, 6, 9, and 15 feet depending on the depth of the water table at the time of installation. The area in which the lysimeters are placed will be sprayed and treated like the rest of the field. The proposed locations of the lysimeter clusters are shown in Figure 2.

#### Comments:

It is recommended that tensiometers be installed with the lysimeter clusters.

#### Weather Station:

An onsite, continuously recording weather station will be installed at the test site to record precipitation, wind speed, soil temperature at three depths, relative humidity, and air temperature during the study. The protocol proposes the installation of two tipping bucket raingauges (one as a back-up), and a temperature probe to record temperature fluctuations. National Oceanic and Atmospheric Administration (NOAA) daily values for pan evaporation and precipitation, and 30-year average pan evaporation and precipitation will also be submitted.

#### Comments:

This portion of the protocol is acceptable.

#### Irrigation:

The original protocol states that "precipitation will be supplemented with irrigation to achieve at least 120 percent of the 30-year mean monthly precipitation volumes recorded for the nearest NOAA stations. Supplemental irrigation will be provided, as needed on a biweekly schedule to ensure that combined volumes of irrigation and precipitation meets or exceeds 120 percent of the normal historical mean monthly volumes".

The protocol amendment states that precipitation will be supplemented with irrigation in order to achieve 125 percent of the long-term average annual precipitation volume. In the letter accompanying the protocol amendments, it was

stated that the "wettest year in ten years received approximately 125% more precipitation than the average year".

Irrigation will be supplied by the standard method used by the farmer. Samples of irrigation water will be analyzed for methomyl before the first application and at the end of the growing season.

Comments:

The proposed irrigation schedule as presented in the protocol amendment is not acceptable. EFGWB generally requests that precipitation plus irrigation on a prospective site total between 125-150% of the 30-year average monthly precipitation. This relatively high volume of water is applied to the field to simulate a "worst case" scenario for pesticide leaching. It is not an attempt to simulate a certain return period on a storm. The registrant should explain why the annual average precipitation was substituted for the monthly average, considering that the monthly average precipitation was stated in the original protocol and discussed in the meeting with EFGWB in April 1992.

In the letter from Du Pont, the registrant described how much water would be applied to the field, when it would be applied, and how the amounts were calculated. However, there is a significant difference between the 30-year average monthly precipitation and the average annual precipitation. The registrant should determine the difference in the amounts of irrigation water that would be applied under two scenarios:

- ◆ the 30-year monthly average, and
- ◆ the annual average proposed in the protocol amendment.

This information should be submitted as soon as possible.

The protocol should also indicate the source of the irrigation water.

Cropping Practices:

Normal agronomic practices for a fall sweet corn crop grown in the Southeast Atlantic Coastal Plain will be followed. The protocol states that the Study Director will be notified of any applications of pesticides in addition to methomyl.

Comments:

This portion of the protocol is acceptable. However, EFGWB also would like to receive notification of any additional applications to the site.

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## APPLICATIONS:

### Tracer:

A single application of a potassium bromide (KBr) tracer will also be made prior to the first methomyl application. The rate of application will depend on the background levels of bromide on the site, but the registrant estimates between 140 - 160 lbs per acre in order to see a breakthrough of the wetting front at depth.

### Test Chemical:

The original protocol states that the test substance will be formulated as Lannate LV, applied at the maximum use rate of 11.0 lb ai/acre per season. The current Lannate label does not indicate a restriction on the total use of the chemical per season. The proposed rate (11.0 lb ai/acre) is being proposed by Du Pont for a label which will replace the existing label.

The chemical will be applied using the "High-Boy" design. According to the protocol amendment, approximately four whorl and 21 ear treatments will be made to the crop, for a total of 26 applications (Table 1). All treatments will be made at 0.45 lb a.i. per acre, resulting in a total application of 11.25 lb a.i. per acre.

Filter cards will be placed within the treatment area for the first five methomyl applications, and the final methomyl application.

### Comments:

This portion of the protocol, including protocol amendments, is acceptable. EFGWB recommends that absorbent paper be used to determine the actual application rate in the field.

## SAMPLING PROCEDURES AND ANALYSES

Soil sampling will be done prior to and just after the first five methomyl applications. Soil sampling will also be done prior to and after the final methomyl application.

Soil-pore water samples and ground-water samples will be collected before the first five methomyl applications, and before the last methomyl application.

Soil, soil-pore water, and ground water samples will then be collected once every month for a period of at least ten months (Table 2).

### Comments:

EFGWB reserves the right to request additional sampling beyond the 12-month sampling period if necessary.

Soil. The soil sampling procedure is acceptable. However, in ground-water monitoring studies, it is hoped that a maximum amount of information will be gained about the test chemical and its fate in soil and ground water. Compositing eliminates some of this information, and for this reason, it is not the preferred method of sample collection. In some cases, sample compositing has caused the results of a ground-water monitoring study to be inconclusive.

The protocol states that "sampling depths will reflect a 2-foot residue-free zone below soil layers with known concentrations of methomyl. If data confirm that deeper sampling is required, the sampling depths will be modified accordingly". This statement appears to be based on the soil sampling guidelines for field dissipation studies. The ground-water monitoring guidelines require standardized depths for soil sampling throughout the study.

Ground-Water. The proposed method of ground-water sampling is acceptable.

Soil-Pore Water. Soil-pore water samples should not be composited unless absolutely necessary for analysis. If compositing is needed because of insufficient sample volume, samples must be obtained from the closest lysimeter clusters and the same depths.

Bromide. The protocol amendment states that all samples (with the exception of spray cards) taken during the study will be analyzed for the bromide tracer. This is acceptable.

#### Additional Samples:

Tank mix samples for both the test chemical and the sodium bromide tracer will be taken after the chemical is mixed (prior to application), and after the application. Field spike samples for both ground-water and soil samples will be taken on the day of application, after six months, and after 12 months. Soil and ground-water samples used for spiking will be taken from the control area.

#### Comments:

This portion of the protocol is acceptable.

#### REPORTS:

An interim field report will be submitted after the 12-month sampling round. A final report will be submitted at the end of the study.

Comments:

A site selection report should be submitted as soon as possible. The interim and final reports should contain information about the test site including: a site map, field slope, soil characteristics, ground-water flow, geology of the area and the site, etc; the random generation scheme for sampling and compositing; equipment and procedures for pesticide application, soil sampling, soil-pore water sampling, and ground-water sampling; sample collection data; and climatological data.

The registrant should also submit brief quarterly progress reports. This will allow the registrant and EFGWB to review the study and make modifications if needed.

Miscellaneous

Detection limits are not stated in the original protocol, although the proposed detection limits are included in the letter from Charles S. Baer to Joanne Edwards (3/11/92). It is proposed that the quantitation for methomyl in soil will be 2 ppb with a minimum detection limit (MDL) of 1 ppb. In water, quantitation will be 0.1 ppb with a minimum detection limit of either "0.05 ppb or 1 ppb". The registrant should clarify which MDL is to be used in the analysis of water samples.

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Methomyl

RIN: 8036-92

Page      is not included in this copy.

Pages 15 through 18 are not included.

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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.

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Environmental Fate & Effects Division  
 PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY  
 METHOMYL

Last Update on December 2, 1992

[V] = Validated Study    [S] = Supplemental Study    [U] = USDA Data

LOGOUT	Reviewer: <i>Ew</i>	Section Head: <i>DW</i>	Date: <i>12/2/92</i>
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Common Name: METHOMYL

Smiles Code: S(C)C(=NOC(=O)NC)C

PC Code # : 90301

CAS #: 16752-77-5

Caswell #:

Chem. Name : S-METHYL-N-[(METHYLCARBAMOYL) OXY]THIOACETIMIDATE

Action Type: Insecticide

Trade Names: LANNATE, LANOX 90, LANOX 216, DPX-X1179, SD-14999, NUDRIN  
 (Formul'tn): GRANULAR; DUST; WATER SOL. POWDER;

Physical State: CLRLSS CRY; SULFUROUS ODR

Use : FIELD CROPS; VEGETABLES; FRUITS; ORNAMENTALS  
 Patterns :  
 (% Usage) :  
 :

Empirical Form: C<sub>5</sub>H<sub>10</sub>O<sub>2</sub>N<sub>2</sub>S  
 Molecular Wgt.: 162.21      Vapor Pressure: 5.00E -5 Torr  
 Melting Point : 78-79 °C      Boiling Point: NA °C  
 Log Kow : 0.11      pKa: @ °C  
 Henry's : E      Atm. M3/Mol (Measured) 1.84E-10 (calc'd)

Solubility in ...					Comments
Water	5.80E	4	ppm	@20.0 °C	
Acetone	E		ppm	@ °C	
Acetonitrile	E		ppm	@ °C	
Benzene	E		ppm	@ °C	
Chloroform	E		ppm	@ °C	
Ethanol	E		ppm	@ °C	
Methanol	E		ppm	@ °C	?
Toluene	E		ppm	@ °C	
Xylene	E		ppm	@ °C	
	E		ppm	@ °C	
	E		ppm	@ °C	

Hydrolysis (161-1)

[V] pH 5.0: STABLE  
 [V] pH 7.0: STABLE  
 [V] pH 9.0: 30 DAYS  
 [ ] pH 10.0: 3 HRS  
 [ ] pH 1.0: 21 HRS  
 [V] pH 4.0: STABLE

Environmental Fate & Effects Division  
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY  
METHOMYL

Last Update on December 2, 1992

[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Photolysis (161-2, -3, -4)

[V] Water:1 DAY IN ARTIFL LIGHT, AT  
[ ] :25 C, pH 5  
[ ] :  
[ ] :

[V] Soil :SiClm, SUNLIGHT, 34 DAYS  
[S] Air :NO DECOMP IN SUN, 120 DA

Aerobic Soil Metabolism (162-1)

[V] SdLm 15-30 DAYS  
[V] MUCK AND SiLm 45 DAYS  
[V] IN STERILE FLANAGAN SiLm, 89%  
[ ] STILL PRESENT AFTER 45 DAYS  
[V] AT 4 PPM, IN SiLm, IN DARK, AT  
[ ] 25 C AND 70% WHC; 30-45 DAYS ✓  
[ ]

Anaerobic Soil Metabolism (162-2)

[V] TOTAL CONVERSION TO CO2 IN  
[ ] ABOUT 8 DAYS  
[ ]  
[ ]  
[ ]  
[ ]  
[ ]

Anaerobic Aquatic Metabolism (162-3)

[ ]  
[ ]  
[ ]  
[ ]  
[ ]  
[ ]  
[ ]

Aerobic Aquatic Metabolism (162-4)

[ ]  
[ ]  
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Environmental Fate & Effects Division  
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY  
METHOMYL

Last Update on December 2, 1992

[V] = Validated Study    [S] = Supplemental Study    [U] = USDA Data

Soil Partition Coefficient (Kd) (163-1)

[ ]	Kads	Kdes
✓ [S]	0.72	1.0
[S]	1.0	1.6
[S]	1.4	2.8
[S]	0.23	0.5
[ ]	See Composition Under Rf	

Soil Rf Factors (163-1)

[ ]	Sd	Si	Cl	%OM	pH	Rf
✓ [S]	61	21	18	2.1	6.5	0.53
[S]	2	81	17	4.3	5.4	0.82
[S]	12	83	5	7.5	5.2	0.52
[S]	60	33	7	1.1	6.6	0.46
[ ]						

Laboratory Volatility (163-2)

[ ]  
[ ]

Field Volatility (163-3)

[ ]  
[ ]

Terrestrial Field Dissipation (164-1)

[V] IN SiLm 98% METHOMYL DISSIPATES WITHIN 1 MONTH; IN LmSd 85%  
[ ] DISSIPATES AFTER 5 MONTHS; NO RESIDUE IN MUCK AFTER 7-32 DA.  
[V] AT 4 LBS AI/A, DECREASED FROM 91% AT DAY 0 TO 55% AT DAY 15,  
[ ] AND TO 33% AT 30 DAYS IN SdLm SOIL IN A GREENHOUSE.  
[V] AT 9 LBS AI/A, IN SdLm, 1/2 LIFE 54 DAYS OVER A 9 MONTH  
[ ] PERIOD (IN CABBAGE).  
[ ]  
[ ]  
[ ]  
[ ]

Aquatic Dissipation (164-2)

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[ ]  
[ ]  
[ ]  
[ ]

Forestry Dissipation (164-3)

[ ]  
[ ]

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Long-Term Soil Dissipation (164-5)

[ ]  
[ ]

Accumulation in Rotational Crops, Confined (165-1)

[V] AT APPL RATE 4X MAX USE, BEETS AND CABBAGE PLANT-  
[ ] ED 30- AND 120 DAYS LATER, CONTAINED .04-.15 PPM

Accumulation in Rotational Crops, Field (165-2)

[ ]  
[ ]

Accumulation in Irrigated Crops (165-3)

[ ]  
[ ]

Bioaccumulation in Fish (165-4)

[V] 96-HR LC50 FOR WARMWATER FISH = 1.05-1.88 PPM; FOR COLDWATER  
[ ] FISH = 1.6 PPM.

Bioaccumulation in Non-Target Organisms (165-5)

[V] 48-HR LC50 FOR DAPHNIA = 31.7 PPB.  
[ ]

Ground Water Monitoring, Prospective (166-1)

[ ] Protocol reviewed for study in Cook County, GA (12/92).  
[ ] Protocol partially acceptable.  
[ ]  
[ ]

Ground Water Monitoring, Small Scale Retrospective (166-2)

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[ ]  
[ ]  
[ ]

Ground Water Monitoring, Large Scale Retrospective (166-3)

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[ ]  
[ ]  
[ ]

Ground Water Monitoring, Miscellaneous Data (158.75)

[S] NEW YORK: 1-20 PPB; NEW JERSEY: TR - 1 PPB; FLORIDA: 1-20 PPB;  
[ ] GEORGIA: 3-5 PPB; MISSOURI: 8.1 PPB  
[ ]

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Field Runoff (167-1)

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[ ]  
[ ]  
[ ]

Surface Water Monitoring (167-2)

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Spray Drift, Droplet Spectrum (201-1)

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[ ]  
[ ]  
[ ]

Spray Drift, Field Evaluation (202-1)

[ ]  
[ ]  
[ ]  
[ ]

Degradation Products

Acetonitrile

CO<sub>2</sub>

(methomyl per se is the only residue of concern in plants)

S-methyl-N-hydroxythioacetimidate

methomyl oxime

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Comments

- In plants, methomyl is absorbed by roots and translocated to leaves.
  - Slightly toxic to avian wildlife.
  - Degradation in soil is primarily a microbial process. Repeated applications within 19 day period may result in prolonged period of reduced nitrification.
  - Can be a hazard to honeybees and other beneficial insects.
  - Health advisory level is 175 ppb.
  - Adsorption is directly related to org. content of soil; adsorption to org. matter is similar to that of terbacil.
- Koc = 72 (U)

References: EPA REVIEWS  
Writer : PJH, MIR, EW