US EPA ARCHIVE DOCUMENT
EEB REVIEW

DATE IN: 01-13-92  OUT: 05-22-92

CASE #: 819491  REREG CASE #: 
SUBMISSION #: S409209  LIST 
ID #: 118601  A, B, C, D

DATE OF SUBMISSION: 12-16-91
DATE RECEIVED BY EFED: 01-07-92
SRRD/RD REQUESTED COMPLETION DATE: 03-15-92
EEB ESTIMATED COMPLETION DATE: 03-15-92
SRRD/RD ACTION CODE/TYP PE OF REVIEW: 627 - Generic Data
MRID #(S): 421299-02

DP TYPE: 001 - Submission Related Data package
PRODUCT MANAGER, NO.: W. Waldrop (71)
PRODUCT NAME(S): Chlorsulfuron
TYPE PRODUCT: F R I N H D Herbicide
COMPANY NAME: Du Pont
SUBMISSION PURPOSE: Review data: honey bee acute study
INCLUDE USE(S): 

COMMON CHEMICAL NAME: Chlorsulfuron
May 8, 1992

MEMORANDUM

SUBJECT: Chlorsulfuron Data Evaluation Record:
Reregistration Follow-up (D172769; 819491; 8409209)

FROM: Doug Urban, Acting Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

TO: Walter Waldrop, PM 71
Reregistration Branch
Special Review and Reregistration Division (H7508W)

DuPont has submitted a honey bee acute study (MRID 421299-02) in
support of reregistration for Chlorsulfuron. The study is
classified as core, and fulfills the data requirement for a non-
target insect acute contact LD₅₀ study (Guideline 141-1). With an
LD₅₀ of >25 ug/bee, the chemical is considered to be relatively non-
toxic to honeybees. The NOEL was 35 ug/bee. 121/4/92

Based on a review of the EEB files and the registration standard
for products containing chlorsulfuron, the following data
requirements are still outstanding:
71-4a: Avian reproduction (TGA1) with waterfowl species
71-4b: Avian reproduction (TGA1) with gamebird species
72-3b: Estuarine/marine mollusc acute (TGA1)
72-4b: Aquatic invertebrate life-cycle (TGA1)
123-1a: Tier II seed germination/seedling emergence (TGA1)
123-1b: Tier II vegetative vigor (TGA1)
123-2: Tier II aquatic plant growth (TGA1)

The following data requirements are reserved for chlorsulfuron:
71-5: Terrestrial field testing (TEP)
72-5: Fish life cycle (TGA1)
72-6: Aquatic organism accumulation (TGA1)
72-7: Aquatic field testing (TEP)
124-1: Terrestrial plant field testing (TEP)
124-2: Aquatic plant field testing (TEP)

If you have any questions on the above, please feel free to contact
Kathryn Valente (308-2804).
DATA EVALUATION RECORD

1. CHEMICAL: Chlorsulfuron. Shaughnessey No. 118601.

2. TEST MATERIAL: H #18,053 (Chlorsulfuron); 2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino]carbonyl]-benzenesulfonamide; Lot No. 12-51; Batch No. 12-51-88; 98.2% purity; an off-white powder.

3. STUDY TYPE: Acute Contact LD$_{50}$ Test. Species Tested: Honey Bee (Apis mellifera).


5. REVIEWED BY: Kathryn F. Valente, M.S. Signature: [Signature]
   Biologist
   Ecological Effects Branch Date: 5/22/92
   Environmental Fate and Effects Division

6. APPROVED BY: Allen Vaughan Signature: [Signature]
   Acting Head, Section 2
   Ecological Effects Branch Date: 5/22/92
   Environmental Fate and Effects Division

   Henry T. Craven, M.S. Signature: [Signature]
   Head, Section 4
   Ecological Effects Branch Date: 5/22/92
   Environmental Fate and Effects Division

7. CONCLUSIONS: This study is scientifically sound and fulfills the requirements for an acute contact study with the honey bee. A 48-hour LD$_{50}$ of >25 µg/bee classifies chlorsulfuron as relatively non-toxic to honey bees (Apis mellifera). The NOEL was determined to be 10.6 µg/bee.

8. RECOMMENDATIONS: N/A.

9. BACKGROUND:
DATA EVALUATION RECORD

1. **CHEMICAL:** Chlorsulfuron.
   Shaughnessey No. 118601.

2. **TEST MATERIAL:** H #18,053 (Chlorsulfuron); 2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino]carbonyl]-benzenesulfonamide; Lot No. 12-51; Batch No. 12-51-88; 98.2% purity; an off-white powder.

3. **STUDY TYPE:** Acute Contact LD$_{50}$ Test. Species Tested: Honey Bee (*Apis mellifera*).


5. **REVIEWED BY:**
   Mark A. Mossier, M.S.
   Associate Scientist
   KBN Engineering and Applied Sciences, Inc.

6. **APPROVED BY:**
   Pim Kosalwat, Ph.D.
   Senior Scientist
   KBN Engineering and Applied Sciences, Inc.
   Henry T. Craven, M.S.
   Supervisor, EEI/EFED USEPA

7. **CONCLUSIONS:** This study is scientifically sound and fulfills the requirements for an acute contact study with the honey bee. A 48-hour LD$_{50}$ of $>25$ μg/bee classifies chlorsulfuron as relatively non-toxic to honey bees (*Apis mellifera*). The NOEL was determined to be 25 μg/bee.

8. **RECOMMENDATIONS:** N/A.

9. **BACKGROUND:**
10. DISCUSSION OF INDIVIDUAL TESTS: N/A.

11. MATERIALS AND METHODS:

A. **Test Animals:** Eight days before test initiation, two frames of bee (*Apis mellifera*) pupae were placed in an incubator and the bees were allowed to emerge as adults. The bees were 1 to 8 days old at the initiation of the test.

B. **Test System:** Bees were contained in one pint rolled paper containers (87 mm in diameter and 85 mm high). Each container was covered with a plastic petri plate in which a 20-ml glass vial containing 50% sugar/water was inserted. This food source was available *ad libitum* throughout the test. A sponge within the chamber was misted daily to increase the humidity. Bees were kept in a test room that was supplied with eight hours of light per day. The temperature was maintained at 23-24°C, and the relative humidity was 62%.

C. **Dosage:** Forty-eight-hour acute contact test. Five treatment levels representing 1.6, 3.1, 6.3, 12.5, and 25 μg/bee were tested along with a solvent control (2 μl acetone/bee) and a negative control.

An appropriate amount of the test material was dissolved in 10 ml of acetone to prepare the dosing solutions. The doses were not corrected for the purity of the test substance (98.2%).

D. **Design:** Two replicates of 25 bees each were used for each treatment and the controls. Twenty-five randomly selected bees were immobilized with nitrogen and laid out on paper. The bees were dosed individually on the thorax and/or abdomen with 2 μl of test solution. Negative control bees were handled identically to treated bees, but were not dosed with any material. Solvent control bees received only acetone. Observations were recorded twice on day 0 and once on day 1 and day 2.

E. **Statistics:** An LD₅₀ value was determined by visual inspection due to the pattern of mortality in this study. The LD₅₀ value was used to classify the test substance according to Atkins' toxicity categories. The categories were: highly toxic (less than 2 μg/bee), moderately toxic (greater than or equal to 2 μg/bee but
less than 11 μg/bee), and relatively nontoxic (greater than or equal to 11 μg/bee).

12. **REPORTED RESULTS:** Cumulative mortalities of the test bees during the 48-hour exposure period are presented in Table 1 (attached). At test termination, negative control and solvent control mortalities were 0 and 4%, respectively. Mortality in the test dosages ranged between 0 and 8%. These mortalities did not follow a concentration-response pattern and were not considered treatment related. A couple of bees at the 1.6 and 25 μg/bee dosage levels and one bee at the 6.3 μg/bee level were observed as immobile on day 0.

13. **STUDY AUTHOR’S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** Chlorsulfuron was classified as relatively non-toxic according to the toxicity categories of Atkins. The honey bee 48-hour contact LD50 value for chlorsulfuron was determined to be greater than 25 μg/bee. **The no-observed-effect dosage (NOED) was 25 μg/bee.**

The study director confirmed that this study was conducted in compliance with Good Laboratory Practice Standards (40 CFR Part 160) with the exception that samples of the dosing solutions were not taken for confirmation of test concentration. A Quality Assurance statement was included in the report.

14. **REVIEWER’S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

A. **Test Procedure:** The test procedures generally follow the protocols recommended by the SEP and Subdivision L guidelines.

B. **Statistical Analysis:** Upon review of the mortality data, the reviewer concurs that the LD50 was greater than 25 μg/bee, and that the NOED was 25 μg/bee.

C. **Discussion/Results:** This study is scientifically sound and fulfills the requirements for an acute contact study with the honey bee. A 48-hour LD50 of >25 μg/bee classifies chlorsulfuron as relatively non-toxic to honey bees (*Apis mellifera*). **The NOED (NOEL) was determined to be 4.5 μg/bee.**

D. **Adequacy of the Study**

   (1) **Classification:** Core.
   (2) **Rationale:** N/A.
   (3) **Repairability:** N/A.

15. **COMPLETION OF ONE-LINER:** Yes, 4-10-92.
## TABLE 1
CUMULATIVE MORTALITY OF HONEY BEES
EXPOSED TO H #18,053 FOR 48 HOURS

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Concentration (µg/bee)</th>
<th>Day 0 First Observation Replicate*</th>
<th>Day 0 Second Observation Replicate</th>
<th>Day 1 Replicate</th>
<th>Day 2 Replicate</th>
<th>Replicates Combined % Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Negative Control</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Solvent Control</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Treatment</td>
<td>1.6</td>
<td>0(1)</td>
<td>0</td>
<td>0(1)</td>
<td>0(1)</td>
<td>3</td>
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<tr>
<td></td>
<td>3.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6.3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0(1)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>12.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0(1)</td>
<td>0(1)</td>
<td>1</td>
</tr>
</tbody>
</table>

*Each replicate contained 25 bees.

( ) Indicates bees found immobile.

The LD50 value was determined to be greater than 25 µg/bee, the highest dose tested.
**Study/Species/Lab/Chemical**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Chlorpyrifos</th>
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<tbody>
<tr>
<td>Chemical Class</td>
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</table>

**Results**

<table>
<thead>
<tr>
<th>Study</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>48-Hour EC₅₀</td>
<td>EC₅₀ &gt; 25 mg/l</td>
</tr>
<tr>
<td></td>
<td>95% C.L.</td>
</tr>
<tr>
<td></td>
<td>PP</td>
</tr>
<tr>
<td></td>
<td>(1/1)</td>
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<tr>
<td></td>
<td>Control Mortality (%) = 0</td>
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<tr>
<td></td>
<td>Solvent Control Mortality (%) = 0</td>
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<tr>
<td></td>
<td>Species:</td>
</tr>
<tr>
<td></td>
<td><em>Sp. melbor</em></td>
</tr>
<tr>
<td></td>
<td>Lab:</td>
</tr>
<tr>
<td></td>
<td>WILDLIFE INTERNATIONAL</td>
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<td>MRID #:</td>
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<td>42129-02</td>
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</tbody>
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**Comments:**

- Based on annual test.
- Notes: 25 mg/l

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**96-Hour LC₅₀**

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<th>Study</th>
<th>Results</th>
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<tbody>
<tr>
<td></td>
<td>LC₅₀ =</td>
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<tr>
<td></td>
<td>PP (1/1)</td>
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<tr>
<td></td>
<td>95% C.L.</td>
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<tr>
<td></td>
<td>Control Mortality (%) =</td>
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<td>Solvent Control Mortality (%) =</td>
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<td>Species:</td>
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<td>Slope =</td>
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<td># Animals/Level =</td>
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<td>Temperature =</td>
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<td></td>
<td>Lab:</td>
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<td>MRID #:</td>
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**96-Hour Dose Level pp (%) Mortality**

<table>
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<th>Study</th>
<th>Results</th>
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**Comments:**

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