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WASHINGTON, D.C. 20460

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**EXPEDITE**  
OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Mancozeb Special Review/Data Call-In - Dairy Cattle  
and Laying Hen Feeding Studies Submitted by Rohm &  
Haas Company (Accession No. 259901/RCB No. 494)

FROM: Michael P. Firestone, Ph.D., Chemist  
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*Michael P. Firestone*

TO: Henry M. Jacoby, PM 21  
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and

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and

Toxicology Branch  
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THRU: Charles L. Trichilo, Ph.D., Chief  
Residue Chemistry Branch  
Hazard Evaluation Division (TS-769C)

*[Handwritten signature]*

Note: This ethylene bisdithiocarbamate (EBDC) data package has been submitted in connection with the NRDC lawsuit. All EBDC reviews are being expedited per the request of Mr. Douglas D. Campt, Registration Division Director (see D. Campt memorandum of June 26, 1985 to J. Melone, Hazard Evaluation Division Director).

Rohm & Haas has submitted the results of lactating dairy cattle and laying hen feeding studies.

The Residue Chemistry Branch (RCB) has been requested to provide screening for adequacy of the two studies.

#### Current Consideration

In the present submission, dated January 28, 1986, Rohm & Haas has included two feeding study reports:

"Feeding of Field-Aged Mancozeb Residues on Alfalfa Hay to Lactating Dairy Cattle" - ABC Report No. 33553 dated January 27, 1986;

"Feeding of Field-Aged Mancozeb Residues to Laying Hens for the Determination of Residues in Meat and Eggs" - ABC Report No. 33552 dated January 27, 1986.

These reports were prepared by Analytical Bio-Chemistry Laboratories, Inc., Columbia, Missouri.

#### A. Dairy Cattle Feeding Study

In this study, four groups of either three or four cows were fed diets containing aged mancozeb residues of nominal levels of 0 (control), 5, 15, or 45 ppm for a period of 28 days. Levels of mancozeb in the treated diets were determined by the CS<sub>2</sub> procedure. All cows but one from each group were sacrificed on day 29 to obtain tissue samples; the remaining cow was kept 1 week longer on control feed before sacrifice. Milk samples were taken twice daily.

Tissue samples analyzed included three types of muscle and three types of fatty tissue, liver, kidney, heart, and thyroid. Milk, tissue, urine, and feces samples were analyzed for ETU (GLC method utilizing a packed column and a flame photometric detector in the sulfur mode) and mancozeb (conversion to carbon disulfide and analysis of CS<sub>2</sub> by GLC using a packed column and a flame photometric detector in the sulfur mode).

## B. Laying Hen Feeding Study

In this study, 4 groups of 10 hens each were orally dosed with pelleted alfalfa meal, prepared from alfalfa hay treated with mancozeb prior to harvest, containing field-weathered mancozeb residues at nominal levels of 0 (control), 5, 15, or 50 ppm for a period of 28 days. A portion of each group was killed on day 29 to obtain tissue samples while the rest were kept on control diets for 7 or 14 days prior to sacrificing.

Pooled samples of eggs, liver, heart, breast and thigh muscle, heart, kidney, gizzard, fat, and excreta were analyzed by methods similar to that used for analysis of mancozeb and ETU in cattle tissue.

### RCB's Comments/Conclusions

The following deficiencies need to be addressed by the petitioner:

1. Storage stability data on tissue, milk, and eggs are required to support the dairy cattle and laying hen feeding studies.
2. Information on the treatment history of the alfalfa fed should be reported. Characterization and quantification of the EBDC-related chemical moieties present in the alfalfa fed to dairy cattle and poultry is required by a more specific method than CS<sub>2</sub> evolution.
3. Many treated milk and tissue samples from the dairy cattle study were not analyzed. Only if samples reflecting the two highest feeding doses are found to contain no detectable residues can the low dose samples be ignored.
4. The petitioner should better explain the high mancozeb levels in the control dairy cattle tissues. These samples contain mancozeb levels higher than samples from treated cattle. Could the samples analyzed for mancozeb have been mislabeled?

5. Thyroid tissue from deperated cattle treated at the low- and mid-dose levels had extremely high levels of mancozeb, about 10 times higher than nondeperated animals in all studies (low-, mid-, and high-dose levels) and about 6 times higher than the high-dose deperated animal thyroid tissue, yet other tissues from these low- and mid-dosed animals were not analyzed. The petitioner should analyze these other tissues (liver, kidney, and fat).
6. With regard to the poultry feeding study, the petitioner has analyzed only one pooled sample for each type of tissue or eggs from a given dose level on a given day. Ideally, the 10 birds in each feeding level should have been split into 3 subgroups so that 3 samples could be analyzed for each feeding level while also insuring that enough sample was available for analysis. The petitioner should examine whether it is possible to reanalyze reserve poultry samples according to the above scheme.

In addition to the above deficiencies, RCB has the following comments:

- a. The adequacy of the feeding levels cannot be determined since residue data for raw agricultural commodities and their processed commodities have not yet been submitted and reviewed.
- b. Should future dairy cattle and/or poultry metabolism studies identify residues of concern other than mancozeb and ETU, additional feeding studies will be required.

In this case, the registrant will need to develop sensitive analytical methods incorporating techniques such as HPLC, GC/MS, etc., especially if these residues are mistakenly determined as mancozeb in the diet and tissues of animals by the available CS<sub>2</sub> method of determination.

cc: Circu, S.F. (EBDC), R.F., M.P. Firestone, A. Farmer (RD),  
Amy Rispin (SIS)

RDI:Section Head:J.H.ONLEY>Date:2/21/86:RDSchmitt:2/26/86

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