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

APR 11 1989

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: DEB Response to Comments submitted on December 27, 1988 by Fermenta Plant Protection Company on EPA's 9/88 Draft Guidance Document for the Reregistration of Chlorothalonil (SRR) [Record No. 238,691, HED Project No. 9-0752A, DEB No. 4892]

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Fermenta has submitted comments, as directed by FR Notice, Vol. 53, No. 209, October 28, 1988, pp. 43766-7, on the draft guidance document for reregistration of products containing chlorothalonil (second round review). In this memorandum, DEB is responding to all Fermenta's comments that pertain to residue chemistry issues and data requirements. Due to their extensive and repetitive nature, the reviewer has summarized and presented the registrant's comments and concerns under general topical headings, rather than listing each specific point separately. Comments pertaining to hexachlorobenzene, an impurity in technical chlorothalonil, will be addressed first.

The DEB conclusions (responses) presented below will, in certain cases, require that the guidance document be revised prior to finalization. The review manager in RB/SRRD is encouraged to consult with DEB during the revision process.

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1. Agency Policy/Requirement: HCB - Interim Dietary Risk Calculations

Hexachlorobenzene (HCB) is an impurity present in technical chlorothalonil at an upper certified limit of 0.05%. Since HCB is a B_2 (probable human) carcinogen, the Agency conducted dietary exposure analyses to estimate the oncogenic risk resulting from the presence of HCB in chlorothalonil formulations applied to food crops. In the draft guidance document, oncogenic risk from HCB was assessed using two different approaches. The first approach was similar to that used when pesticide tolerances are used to assess risk (worst-case scenario). The maximum reported levels of HCB in food commodities following registered use in controlled field trials were used. In many cases, where no measurable residues were observed, the detection limit (3 ppb) was used as an upper bound for expected HCB residues. In cases where measurable residues of HCB occurred following registered use (e.g., broccoli, celery, etc.), the maximum value was adjusted for the percent HCB relative to chlorothalonil present in the batch of formulated product used in the residue trial. For example, if the percent of HCB relative to chlorothalonil in a product was 0.025% rather than the certified limit of 0.05%, the reported HCB residue values were multiplied by 2 to ensure that the residue estimate reflected the maximum residues that could occur if a product containing the maximum legal limit of HCB were used. This approach resulted in an estimated risk of 10^{-5}.

In an effort to obtain a more realistic estimate of risk, an additional analysis was conducted in which average expected dietary residues of chlorothalonil obtained from FDA surveillance monitoring data were multiplied by 0.5%. The 0.5% value was based on the available controlled field trial data in which measurable residues of both chlorothalonil and HCB occurred. A comparison of percent HCB relative to chlorothalonil was made to determine whether HCB occurs in the same ratio on the harvested crop as in the formulated product (i.e., if the degradation rates of HCB and chlorothalonil following application are similar). The limited data available indicated that HCB may degrade more slowly on plants than chlorothalonil, resulting in an increased percent of HCB relative to chlorothalonil (0.5%) in the harvested commodity. Data from a total of 40 samples submitted for six crops were used in making this determination. Although it was recognized that these data were limited and additional data were needed prior to making a final determination, 0.5% was used as an interim value to estimate dietary exposure to HCB as a result of chlorothalonil use. This approach resulted in an estimated risk of 10^{-6}.

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Registrant Comment:

Fermenta disagrees with the use of 0.5% of the average dietary residue values of chlorothalonil to arrive at estimated HCB levels. They claim that the current upper certified limit for HCB in technical chlorothalonil (0.05%) should be used instead. The following arguments were presented in support of their contention: [Arguments a-d are based on previously submitted data reviewed by DEB and used in the risk assessment presented in the guidance document, while argument e is based on new (previously unsubmitted) data.]

a. The majority of the residue data indicate that no apparent HCB residues (<3 ppb) will occur following registered use.

b. Measurable HCB levels, when they occurred, were generally near the detection limit.

c. In general, consistent HCB levels did not occur between duplicate laboratory samples or among field replicates from treated plots.

d. Levels of HCB in treated samples were not adjusted for control values above the detection limit, when they occurred. Also, in the case of cucumbers, the percentage of treated samples bearing detectable residues was equal to that for untreated samples.

e. Previously unsubmitted residue data from two lima bean trials were presented in which residues of chlorothalonil and HCB were determined in vines 0, 7, and 14 days after treatment. Residues of HCB in these trials were significantly above the detection limit and the control values at 0 and 7 days after treatment [HCB residues = 19-51 ppb in treated samples and 5 ppb in untreated samples]. The percent of HCB relative to chlorothalonil was approximately 0.05% and remained constant throughout the trials.

Based on these arguments, Fermenta concludes, "The most meaningful assessment of potential dietary exposure to HCB from application of chlorothalonil is by multiplying the average dietary residues of chlorothalonil by the maximum specification value of 0.05% HCB in chlorothalonil." Additionally, Fermenta claims that no additional HCB residue data should be required.

Although Fermenta asserts that no dietary risk will occur due to the presence of HCB in chlorothalonil products, they have posed the following questions: " . . . how much would the HCB level have to be reduced in technical chlorothalonil to alleviate the Agency's concerns regarding HCB?" and "Since a large number of

the data requirements imposed in the Standard relate to HCB, could these be dismissed if the maximum level of HCB were to be reduced by a certain percentage, perhaps by 50%?"

DEB Response:

DEB agrees that the data used to obtain the 0.5% value used in estimating dietary risk resulting from the presence of HCB in chlorothalonil were of limited value. In the draft guidance document this value was put forth only as an interim, relatively conservative value, which was used to develop an interim risk assessment until more realistic data regarding the degradation of HCB relative to chlorothalonil could be generated. DEB agrees that the use of a handful of erratic values near the detection limit is not a desireable means of assessing risk and for this reason required a significant quantity of additional data depicting the accumulation/degradation of HCB on a variety of crops on which chlorothalonil use is registered. To prevent a recurrence of the HCB detection problem encountered in previously submitted data, development of a more sensitive method with a lower limit of detection (0.5-1 ppb) was required.

It has been shown that, in most cases, residues of HCB following registered use of chlorothalonil will be $\leq$3 ppb (limit of detection). As described in the initial oncogenic risk assessment for HCB presented in the guidance document, use of 3 ppb in dietary exposure analysis results in a calculated oncogenic risk of 10^{-5}. Thus, in order to develop data yielding a more realistic estimate of dietary exposure to HCB, the analytical method would have to be improved such that a very low limit of detection was achieved. Alternatively, reliable data relating to the rate of degradation of HCB relative to chlorothalonil would need to be developed. If the limit of detection cannot be practically lowered (as Fermenta has suggested) and the latter approach is preferred, application rates will need to be exaggerated to ensure that measurable residues of HCB significantly above the detection limit occur. If a product that contains 0.05% HCB relative to chlorothalonil is used, residues of chlorothalonil immediately after treatment must be at least 6 ppm to permit detection of HCB at a detection limit of 3 ppb (6 ppm x 0.05% = 3 ppb). If the product contains HCB below the certified limit (e.g., 0.025%), residues of chlorothalonil must be even higher (e.g., 12 ppm x 0.025% = 3 ppb). Thus, to ensure that residues of HCB will be present at a level sufficiently above the detection limit and such that degradation relative to chlorothalonil can be determined, use of exaggerated rates resulting in high initial chlorothalonil levels will be necessary. In the summary of the newly submitted bean vine study, Fermenta reported initial chlorothalonil residues of 73-101 ppm in treated samples. These high initial residue levels permitted calculation of HCB relative to chlorothalonil at several harvest intervals after treatment. In the majority of

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the previously submitted data reviewed by the Agency, chlorothalonil residues were too low (<6 ppm) to permit detection of HCB when present at ≤0.05% levels.

DEB feels that it is essential to have adequate, valid data regarding the dietary exposure to HCB as a result of chlorothalonil use because HCB has been classified as a B_2 oncogen with a Q_1^* of 1.7 $(mg/kg/day)^{-1}$. [This represents an oncogenic potency >150x that of chlorothalonil (Q_1^* = 0.011 $[mg/kg/day^{-1}]$).] If no significant difference is found between the rate of degradation of chlorothalonil and HCB on field-weathered samples, the Agency will be able to use the certified limit for HCB in technical chlorothalonil as a means of estimating HCB in food commodities found to contain chlorothalonil in FDA surveillance monitoring. However, the currently available data are insufficient to ascertain that HCB will not degrade more slowly than chlorothalonil. The lima bean vine data newly submitted by Fermenta are useful but cannot be the sole support for assuming that rates of degradation will be equivalent on all crops. Additional data in support of this contention must be provided as required in the draft guidance document. DEB is, however, prepared to modify the requirement at this time to recommend the use of exaggerated rates rather than a lowered detection limit, since the registrant has claimed that development of a lower detection limit is not practical. Also, the requirement should be revised such that data are no longer required for minor crops (broccoli, mint, papayas, passion fruit, and grass grown for seed) or crops having chlorothalonil tolerances below 1 ppm (potatoes, bulb onions, peaches, bananas, coffee beans, cocoa beans, and peanuts). Crops having low tolerances are being dropped from the requirement because it may be impractical to apply exaggerated rates sufficiently high to yield measurable residues of HCB. Originally, no additional data were required for celery (tolerance = 15 ppm) because 21 samples were available reflecting measurable levels of HCB. However, as the registrant has stated, these levels were near the limit of detection and cannot be used to realistically calculate the expected percent of HCB relative to chlorothalonil in the marketed commodity. Therefore, the data gap should also be revised to include celery. In summary, HCB residue studies now are required for the following crops: carrots, green onions, celery, succulent beans, tomatoes, cucumbers, cranberries, and fresh corn and corn forage.

Due to the overall insufficiency of the data base for residues of HCB in food commodities resulting from use of chlorothalonil, DEB is unable to provide the registrant with any assurance that a 50% reduction in HCB will alleviate all dietary concern for this carcinogenic impurity. Obviously, any reduction in levels of toxic impurities in pesticide products is desireable and will lower dietary risk. However, until the Agency has adequate, valid data regarding the degradation of HCB relative to

chlorothalonil on field-weathered food and feed commodities, and has a complete data base regarding levels of HCB that may be expected to occur in meat and milk, reliable estimates of oncogenic risk cannot be made, regardless of the upper limit in the technical product.

2. Agency Policy/Requirement: HCB Feeding Studies in Livestock

Since HCB residues may be expected to occur, albeit at low levels, in livestock feed commodities, the draft guidance document required livestock feeding studies. Since the expected level of HCB cannot be determined at present, no specific feeding levels were required. Rather, "levels representative of 1X, 3X, and 10X the anticipated average concentration in the diet resulting from the use of chlorothalonil on feed items" were required.

Registrant Comment:

Fermenta has stated that the sequence of data generation required to fulfill this requirement cannot be accomplished within the time allocated in the data requirement table (18 months) because time will also be required to generate the necessary HCB residue data on feed items.

Also, Fermenta requests that the requirement be reserved pending evaluation of the HCB residue data on feed commodities and review of available HCB bioaccumulation data in the scientific literature. In this regard, they have included the following two review articles on this subject in their comment package:

> Vreman, K. et al. 1980. Transfer of organochlorine pesticides from feed into the milk and body fat of cows. Long-term experiment with intake at low levels. Neth. Milk Dairy J. 34:87-105.
>
> Hansen, L.G. et al. 1981. Disposition of hexachlorobenzene in domestic animals. In: Toxicology of Halogenated Hydrocarbons, Health and Ecological Effects (M.A.Q. Khan, R.H. Stanton, Eds.) Pergamon Press, New York.

DEB Response:

A practical time frame for submission of the required feeding studies is 36 months. This would give the registrant time to complete the necessary field trial and processing data that will be used in estimating livestock exposure to HCB.

DEB will accept published studies completed by laboratories other than the registrant's only if the registrant can certify that they have ready access to all the raw data generated during the course of the study. Such studies may be submitted in response

to the final guidance document. The requirement for submission of HCB feeding studies will not be changed to "reserved" status because DEB has sufficient information to conclude that low levels of HCB occur in feed commodities following chlorothalonil use and that bioaccumulation of HCB occurs in livestock tissues.

3. Agency Policy/Requirement: Processing Studies Pertaining to HCB

In the draft guidance document, studies were required to determine the potential for HCB concentration in the processed products of tomatoes, cocoa beans, coffee beans, and peanuts.

Registrant Comment:

Fermenta argues that it is extremely unlikely that measurable residues of HCB will occur in peanuts, cocoa beans, or coffee beans even if exaggerated rates are used because of the low expected residues of chlorothalonil per se (tolerances = 0.2 ppm, coffee beans; 0.05 ppm, cocoa beans; and 0.3 ppm, peanuts).

DEB Response:

DEB agrees that the completion of HCB processing studies using field-weathered residues may be impractical for these crops. For example, for cocoa beans a 120x rate would be required to obtain HCB residues of 3 ppb immediately after application of a product that contained HCB at maximum levels. Therefore, the requirement for processing studies for peanuts, cocoa beans, and coffee beans should be dropped. However, the requirement for a processing study for tomatoes still stands (tolerance = 5 ppm). By applying exaggerated rates (e.g., 10x) of a product containing 0.05% HCB relative to chlorothalonil, it should be possible to obtain measurable residues of HCB significantly above the detection limit in raw whole tomatoes.

Availability of tomato processing data for HCB will permit the Agency to use realistic values in assessing dietary exposure to HCB in processed tomato products obtained from tomatoes treated with chlorothalonil. These factors may be applied to the estimated HCB levels in raw tomatoes (obtained from FDA monitoring data) as was done for chlorothalonil per se. In the absence of supporting data, DEB cannot assume that concentration/reduction of HCB on processing will occur in the same manner as for chlorothalonil.

4. Agency Policy/Requirement: Bibliographic citations pertaining to HCB Residues in Crops

In the draft guidance document only three references were cited as partially satisfying the data requirements for HCB residues in crops.

Registrant Comment:

Fermenta states that many other studies containing HCB residue data, not cited in the guidance document, have been submitted.

DEB Response:

The references cited in the guidance document were for celery because at that time DEB had concluded that the HCB data for celery were adequate. However, based on the registrant's comments, DEB is now requiring additional data for celery (see #1, above). Therefore, the celery citations should be deleted from the residue chemistry data requirement table. References not considered useful for fulfillment of data requirements are not normally cited in the data requirement tables.

5. Agency Policy/Requirement: Plant Metabolism

The draft guidance document required additional data regarding the nature of the residue in plants. Specifically, data depicting the nature of the residue in plants following (i) foliar application, and (ii) exposure to several known soil metabolites were required.

Registrant Comment:

The registrant feels that the outstanding data gaps outlined in the guidance will be satisfied after Agency review of the following three studies that were not reviewed by DEB for the draft document:

- MRID 00139550. An Indoor Crop Rotation Study with ^{14}C-Chlorothalonil (2,4,5,6-Tetrachloroisophthalonitrile). Document Number 608-4EF-82-0169-001.
- MRID 40183401. A Plant Metabolism Study with ^{14}C-Chlorothalonil (2,4,5,6-Tetrachloroisophthalonitrile) on Carrots. Document Number 1186-86-0026-EF-001.
- MRID 40684801. A Plant Metabolism Study with ^{14}C-Chlorothalonil (2,4,5,6-Tetrachloroisophthalonitrile) on Tomatoes. Document Number 1184-85-0052-EF-001.

DEB Response:

It is true that the Residue Chemistry Chapter of the SRR, dated 3/11/88 did not include review of the above-cited studies.

The rotational crop study was not selected from the bibliography for review because rotational crop studies are normally submitted to fulfill environmental fate data requirements (guidelines

reference nos. 165-1 and -2), rather than requirements regarding the nature of residue in plants (guidelines reference no. 171-4). In this case, however, since one of the plant metabolism data requirements pertains to uptake of soil metabolites of chlorothalonil, certain rotational crop studies may be useful in detailing the nature of the residue in plants. In responding to the final guidance document, the registrant may submit pertinent rotational crop studies, if they will partially satisfy the outstanding data requirement regarding plant metabolism.

The remaining studies, depicting the metabolism of chlorothalonil following foliar treatment of carrots and tomatoes were not reviewed because they did not appear on the 7/20/87 bibliography from which studies were selected. The carrot study (MRID 40183401) was submitted on 5/4/87 and the tomato study (MRID 40684801) on 6/24/88. [Apparently, the carrot study, though submitted prior to the bibliography date, had not been entered into PDMS as of 7/20/87.] Part of the outstanding data requirements for plant metabolism pertain to foliar treatments. Therefore, these studies, if conducted according to the Subdivision O Guidelines, may partially satisfy data requirements pertaining to the nature of the residue in plants. DEB suggests that these studies be submitted (or cited) by the registrant in responding to the plant metabolism requirements in the final guidance document for reregistration of chlorothalonil.

The RB/SRRD Review Manager should note that the metabolism studies cited by the registrant will be reviewed in conjunction with PP#6E3410 (chlorothalonil on mushrooms). The DEB due date for completion of this review is 5/31/89. It may be possible to use the DEB conclusions resulting from the review to revise the plant metabolism requirements in the draft guidance document, if it has not gone final prior to 5/31/89.

6. Agency Policy/Requirement: Livestock Metabolism

In the draft guidance document, the Agency required metabolism studies for both ruminants and poultry.

Registrant Comment:

Fermenta has agreed to conduct metabolism studies using lactating goats. However, for poultry they cite MRID 00127866, which contains poultry metabolism studies for both chlorothalonil and its 4-hydroxy metabolite.

DEB Response:

The cited poultry metabolism studies were reviewed in 1983 by M.F. Kovacs, in conjunction with PP#3F2875. Dr. Kovacs concluded that the studies did not satisfy the requirement for poultry

metabolism data because ^{14}C-residues in eggs and tissues were not characterized. Thus, this data requirement remains outstanding.

7. Agency Policy/Requirement: Testing of enforcement method in conjunction with plant and animal metabolism studies

The draft guidance document required that representative samples from the metabolism studies be analyzed by enforcement method I in the PAM, Vol. II to ascertain that the method is capable of adequately recovering and quantifying all residues of concern.

Registrant Comment:

Fermenta feels that more recently developed methods, that are modifications of Method I in the PAM, Vol. II, should be tested rather than Method I in the PAM, Vol. II, because the newer methods permit quantitation of the soil metabolite, SDS-46851, HCB and pentachlorobenzonitrile (PCBN) in addition to the parent and its 4-OH metabolite. They state, "The extracting solvent and quantitation approach are essentially the same in both procedures. The more recent procedure simply divides the sample extract into different fractions for quantitation by partitioning and chromatographic cleanup procedures."

DEB Response:

The newer methods that the company describes have been reviewed in the Residue Chemistry Chapter of the SRR. DEB agrees that the modifications made are minor. Therefore, these methods may be tested in conjunction with the required metabolism studies instead of Method I in the PAM, Vol. II.

After all metabolism and method issues pertaining to chlorothalonil residues of concern have been resolved, steps will be taken by the Agency to ensure that the best available regulatory method is published in the PAM.

8. Agency Policy/Requirement: Storage Stability

The draft guidance document required that storage conditions and intervals of storage be provided for all previously submitted and currently required residue data and that stability data be provided for all residues of concern reflecting these intervals and conditions (for representative commodities). The registrant was given the option of using field-weathered or fortified samples to complete this requirement.

Registrant Comment:

Fermenta has agreed to conduct storage stability studies on ten representative agricultural commodities. They plan to use field-incurred residues as the means of determining stability.

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However, should no measurable field-incurred residues of HCB occur, the registrant does not plan to substitute fortified samples for field-weathered samples. They state, "We do not agree that fortification or 'spiking' with residues is a valid method of studying the storage stability of HCB or other compounds, since techniques of this nature may introduce artifactual results that would not be typical of those which would occur from field-incurred residues following applications of the TEP."

DEB Response:

DEB agrees that the use of field-incurred residues in storage stability studies is the preferred means of assessing stability, particularly for systemic residues. However, since, as Fermenta has noted, it may be difficult to generate measurable field-incurred residues in certain instances, the option of using fortified samples has been given. If measurable residues of HCB or any other residue of concern resulting from chlorothalonil use do not occur in samples intended for use in storage stability studies, fortification of such samples to determine stability will be required.

9. Agency Policy/Requirement: Harmonization of U.S. Tolerances and Codex MRLs

On page 43 of the draft guidance document it was noted, "due to toxicology concerns (oncogenic risks) the tolerances for residues in or on bulb onions, cherries, and peaches may not be raised to achieve compatibility at this time."

Registrant Comment:

Fermenta's response to the Agency's position on this topic was as follows: "If the actual residues are at a level which are in line with the negligible risk standard, the Agency should consider amendments to increase tolerances."

DEB Response:

There are several reasons why raising tolerances to achieve compatibility with Codex is not desireable at this time. They are as follows:

i) The Agency has not made a final determination regarding the nature of the residue and, therefore, the residues of concern in plants.

ii) The U.S. currently regulates residues of the 4-OH metabolite of chlorothalonil as well as the parent while the Codex Commission's MRLs cover only residues of chlorothalonil per se.

iii) In general, the U.S. sets tolerance levels to reflect only slightly higher levels than are expected to occur in commodities following registered use at maximum-permissible rates and minimum-permissible PHIs. This permits enforcement officials to detect illegal use, should it occur. Therefore, in a case such as this where oncogenic risk from both the active ingredient and an impurity is of concern, DEB feels it is unwise to raise tolerance levels such that misuse might not be detected.

10. Agency Policy/Requirement: 5% Dust Formulation (7401-331)

The draft guidance document required that label amendments be submitted for the 5% Dust formulation, specifying a maximum single application rate and a maximum number of applications/season for treatment of various vegetable crops.

Registrant Comment:

Fermenta points out that they do not have a 5% Dust formulation of chlorothalonil. They suggest that the Agency identify the registrant for this formulation. Furthermore, Fermenta disagrees with the need to conduct residue studies on each formulation as long as the amount of active ingredient and the PHI do not exceed those used in studies on which tolerances are based and use patterns established.

DEB Response:

The 5% Dust formulation that permits use on food commodities is registered by the Voluntary Purchasing Group, Inc., Bonham, TX (EPA Reg. No. 7401-331).

The Agency does not normally require residue data on each formulation. However, data are required for a representative product from each formulation class (wettable powder, emulsifiable concentrate, granular, dust, etc.). Generally, if several products in a given formulation class exist, data are required for the product that would be expected to result in the highest residues following legal use (highest application rate, lowest PHI, etc.).

11. Agency Policy/Requirement: Residue Data for Potatoes

The draft guidance document required data depicting residues of concern in or on potatoes harvested immediately after the last of

several foliar applications of a DF, WP, or FlC formulation at 1.44 lb ai/A.

Registrant Comment:

Fermenta disagrees that studies must be conducted with a zero-day PHI. They claim: " . . . in practical use, under most circumstances the interval from the last application of chlorothalonil products until tuber harvest is several weeks, not days." However, they state that they would prefer not to cite a specific PHI on the label. They feel it should be left up to the grower to determine how close to harvest foliage protection is warranted.

Fermenta also states that the 1.44 lb ai/A rate exceeds the maximum label rate for potatoes.

DEB Response:

The available potato residue data indicate that residues will not exceed the current tolerance in or on potatoes harvested at least 7 days following the last application. Since the registrant claims that, in most circumstances, the last application will be made several weeks prior to harvest, DEB suggests that a PHI of 7 days would not be an unreasonable burden on the grower. If the registrant is unwilling to implement such a PHI, the requirement for data reflecting harvest on the day of the final treatment must stand.

According to the 12/87 Final Index Entry for Chlorothalonil (BEAD), an MAI product (72% WP, 100-658) permits use on potatoes at 1.08-1.44 lb ai/A.

12. Agency Policy/Requirement: Potato Processing

The draft guidance document required data depicting the potential for concentration of residues of chlorothalonil and its 4-OH metabolite in the processed products of potatoes (potato chips, dry and wet peel, and granules or flakes).

Registrant Comment:

Fermenta feels that the previously submitted study reviewed in the Residue Chemistry Chapter of the SRR (MRID 40183404) satisfies the potato processing data requirement. They maintain that the study shows that " . . . no potential exists for chlorothalonil related residues to be present in potato chips or dehydrated (granular or flaked) from the use of formulated chlorothalonil on potato foliage." Also, the registrant asserts that no data depicting potential concentration of HCB should be required since residues of HCB were nondetectable (<3 ppb) in the

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raw agricultural commodity following treatment at an exaggerated rate (7.4x the maximum permissible rate for the F1C formulation).

DEB Response:

The registrant is correct in pointing out that no additional data should be required regarding the potential for concentration of residues of chlorothalonil or its 4-OH metabolite in potato chips, dehydrated potatoes (granular or flaked) or wet peels (concentration up to 13x occurs). However, since processed potato waste may include dry peel (theoretical concentration factor = 50x), additional data reflecting the expected concentration of chlorothalonil and its 4-OH metabolite in this processed product must be provided.

The registrant should note that no data were required in the draft guidance document regarding potential concentration of HCB in processed potato products.

13. Agency Policy/Requirement: Celery

In the draft guidance document, the registrant was required to provide an explanation for the tolerance-exceeding residue values reported for celery in PP#7F0599.

Registrant Comment:

The registrant has pointed out that all tolerance exceeding values represent use of a rate greater than 1.125 lb ai/A with less than a 7-day interval between applications (3- or 4-day interval). [Registered use permits applications at $\leq$1.125 lb ai/A made at 3- to 5-day intervals and applications at 1.5-2.25 lb ai/A made at $\geq$7-day intervals.]

DEB Response:

DEB has reevaluated the data submitted under PP#7F0599 in light of the registrant's comments and finds that their explanation is valid. Furthermore, the significant body of celery residue data submitted in response to the registration standard (40000104 and 40183407) and other data not previously reviewed (00084829) for the initial Standard support the established tolerance. Therefore, the requirement for additional celery data may now be reserved, pending evaluation of the required plant metabolism, storage stability and method validation data.

14. Agency Policy/Requirement: Cauliflower

The draft guidance document required that the registrant either propose a longer PHI (supported by residue data) or an increased tolerance for cauliflower.

Registrant Comment:

Fermenta submits that the available data support the currently registered use and tolerance for cauliflower.

DEB Response:

The available residue data for cauliflower are discussed in the Residue Chemistry Chapter of the SRR. Briefly, the data indicate that combined residues of chlorothalonil and its 4-OH metabolite in or on cauliflower will approach the tolerance (5 ppm) following use at 0.8x the maximum registered rate (1.44 lb ai/A for MAI formulations). The geographic locations of the test sites for cauliflower were inadequate (FL, NY, and OR) because the majority of cauliflower is produced in CA. Therefore, data reflecting use of chlorothalonil on broccoli were also considered in assessing the tolerance for cauliflower. The broccoli data indicate that residues up to 12 ppm may occur following use at 0.8x the maximum registered rate. Therefore, the currently available data do not support the established tolerance. As an alternative to the options already given to the registrant in the draft SRR (higher tolerance, higher PHI), data may be submitted reflecting multiple foliar applications at the maximum rate from tests conducted in CA. These data could be used to assess the cauliflower tolerance in lieu of the translated data for broccoli.

15. Agency Policy/Requirement: Greenhouse Tomatoes

The draft guidance document required data depicting residues in or on greenhouse tomatoes treated with either the 90% DF or 20% Impr formulation at 0.7 oz ai/1000 sq. ft.

Registrant Comment:

Fermenta claims that the 90% DF is not registered for use on greenhouse tomatoes. Therefore, they claim that this requirement should be deleted.

DEB Response:

According to the 7/11/87 Final Index Entry for Chlorothalonil (BEAD), the 90% DF formulation (50534-157) is registered for use on greenhouse tomatoes. SRRD is advised to check with RD regarding the status of this registration. However, even if the 90% DF is not registered for use on greenhouse tomatoes, the requirement must stand since the 20% Impr formulation is also registered for use on greenhouse tomatoes.

16. Agency Policy/Requirement: Bananas

The draft guidance document required that all labels permitting use on bananas grown in countries that export to the U.S. be amended to specify a 2-day PHI consistent with the posttreatment interval reflected in the submitted residue data.

Registrant Comment:

Fermenta claims that a "considerable body of data have been submitted to the Agency which contains result from residue analyses with a 0-day PHI."

DEB Response:

The available data for bananas were reviewed in the Residue Chemistry Chapter of the initial Standard (geographic representation inadequate), in a 9/23/85 memo by M. Firestone (inadequate application regimen) and in the Residue Chemistry Chapter of the SRR (data reflect a 2-day PHI). DEB concluded, in the SRR chapter, that the body of data available for bananas would support the tolerance, provided a 2-day PHI was implemented. Therefore, this data requirement must stand.

17. Agency Policy/Requirement: Passion Fruit

The draft guidance document required that residue trials on passion fruit be conducted in HI, based on production data presented in the 1982 Census of Agriculture, Vol. 1, Part 51, p. 363.

Registrant Comment

Fermenta claims that the passion fruit industry has moved from Hawaii to Puerto Rico and southern Florida. They state that the commercial acreage in Hawaii is no longer sizeable enough to justify the conduct of residue studies on passion fruit by IR-4, but that significant acreage for residue trials now exists in Florida. Therefore, Fermenta has enlisted the assistance of IR-4 to conduct a field study in Florida.

DEB Response:

DEB has verified the registrant's claim that the passion fruit industry in FL is increasing and is expected to constitute a significant acreage in the near future (personal communication between F. Boyd [DEB] and Norman Cousins [consultant to J.R. Brooks & Son, Homestead, FL] on 3/31/89). Also, the IR-4 Western Regional Coordinator has confirmed that passion fruit production has decreased significantly in Hawaii in recent years (personal communication between F. Boyd [DEB] and Harold Alford [IR-4] on

3/30/89). Therefore, passion fruit data are now required from Florida, rather than Hawaii.

18. Agency Policy/Requirement: Peanuts

The draft guidance document listed footnotes 16 and 33 for peanuts in the residue chemistry data requirement table.

Registrant Comment:

Fermenta has pointed out that footnote 16 refers to a potato processing study.

DEB Response:

The guidance document should be revised to list footnotes 15 and 33 for peanuts. [Footnote 15 states, "Additional data may be required on receipt of the required plant metabolism, storage stability, and method validation data."]

19. Agency Policy/Requirement: Grass Grown for Seed

The draft guidance document required data depicting residues of chlorothalonil and its 4-OH metabolite in or on the forage, hay and seed of grass grown for seed. Required test sites included AR, KS, KY or TN, MO, NY or PA, OK or TX, and VA. Tolerance proposals for each commodity were also required.

Registrant Comment

Fermenta maintains that the use on grass grown for seed is a nonfood, nonfeed use because: "The crop is never harvested for forage and the fodder is useless as animal feed and has been historically burned. In the case of grass seed crops, plant residues which remain on the land after seed harvest offer no feed value for livestock, since the leaves and pseudostems must be fully senescent in order to enable seed harvest, contain no digestible nutrients, and are highly abrasive to animal alimentary systems." They further state, "Labeling for chlorothalonil products which cover grasses grown for seed specifically prohibit the use of treated plant parts for livestock feed, as well as the grazing of livestock in treated areas. These prohibitions cover crop residues which are in total control of the grower who would elect to use the chlorothalonil product in the first place."

The registrant also disagrees with the test site locations required by the Agency since "grass grown for seed is a minor use and the acreage is located primarily in WA, ID, and OR." They state that although MO was the major producer of tall fescue seed, essentially none is treated with a fungicide.

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DEB Response:

The registrant is correct to question the need for residue data for the forage and hay of grass grown for seed since label restrictions prohibit feeding of treated plant parts to livestock. However, the grower will have no control over the disposition of seed once it has been sold. Recently, DEB has required data for seed and seed screenings resulting from seed processing because these may be pelletized and sold as animal feed. Commercial seed processors may not necessarily be aware of pesticides used during production of the seed. A recent incident in the Pacific Northwest where residues of pesticides registered for use on grass grown for seed were found in animal feed which had grass seed screenings as a component precludes further consideration of such uses as nonfood.

The registrant is also correct in questioning the geographic test site locations specified in the guidance document. Data should be submitted only from OR and MO. However, if the registrant is willing to pursue a regional tolerance for the Pacific Northwest, data from OR only will be required.

The guidance document should be revised to require data for seed (before and after screening) and seed screenings obtained from chlorothalonil-treated grass grown for seed in OR and MO.

20. Agency Policy/Requirement: Rotational Crops

In the draft guidance document, on p. 54, the Agency imposed the following interim labeling requirement for end-use products registered for use on food/feed crops:

> "For crops not listed on the label, do not rotate until 12 months after the last treatment."

Also, footnote 35 in the residue chemistry data requirement table required that the registrant select several common field crops to be rotated with grass grown for seed, peanuts, soybeans and mint following treatment with chlorothalonil. For each field crop selected, residue data and a rotational crop tolerance were required reflecting a plant-back-interval of $\leq$12 months.

Registrant Comment:

Fermenta objects to the need for rotational crop data following chlorothalonil use on mint and grass grown for seed. They state, "There is no utility in conducting rotation studies following use of Bravo on mint or grass grown for seed, as these are minor uses and crops are not grown in rotation with mint to any degree." They also claim that both crops are grown essentially as perennial crops. They have instituted several rotational crop studies that are currently ongoing. These studies were

apparently designed to depict residues in a variety of crops not presently on chlorothalonil labels (small grains, corn, sorghum, oilseeds, fruiting vegetables, leafy vegetables, and root crops) when rotated in after direct treatment of potatoes, tomatoes, peanuts, cucumbers, broccoli, and soybeans.

DEB Response:

DEB has reexamined the cultural practices used in growing mint and grass grown for seed and agrees with Fermenta's contention that these crops are grown essentially as perennials. However, details regarding the ongoing rotational crop studies conducted by Fermenta have not been provided. Therefore, it is not possible to assess their adequacy at this time. DEB originally required rotational crop data following direct use only on certain field crops because it was felt that chlorothalonil was registered on a sufficient number of vegetable crops to limit rotation only to crops specified on the label without an undue burden on the grower. This approach was taken by the Agency in an effort to minimize rotational crop data requirements. Apparently Fermenta feels that growers using chlorothalonil may wish to rotate to other vegetable crops not currently on the label since the ongoing rotational crop studies include vegetable crops.

The registrant should note that final labeling requirements regarding rotation will be dependent upon the rotational crop data submitted. Tolerances for specific rotational crops will be tied to labeled plant-back-intervals which must be supported by residue data. The label will permit rotation only to nonfood crops and crops on which tolerances exist to cover direct or indirect (inadvertent) residues of chlorothalonil.

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cc:RF,Circ.,Edwards,Reg.Standard File (SRR),PMSD/ISB,-
A.Rispin(SIPS/EFED)
RDI:W.Boodee,4/89;E.Zager,4/89