PP# 4F04407
7-31-96

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

JUL 31 1996

OFFICE OF
PREVENTION, PESTICIDES, AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: PP# 4F04407. Sulfentrazone (Authority Herbicide) for Use on Soybeans. Amendments of 5/30/96 and 7/11/96 and Anticipated Residues. MRID# 439268-10. Chemical# 129081. Barcodes D227010, D228065 & D228251. CBTS#s 17289, 17398 & 17403. Case 285935.

FROM: G.F. Kramer, Ph.D., Chemist
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THRU: E.T. Haeberer, Acting Branch Chief
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TO: D. McCall/ S. Robbins
Registration Section, RCAB
Health Effects Division (7509C)

FMC has submitted a petition for time-limited tolerances for the combined residues of the herbicide sulfentrazone (N-[2,4-dichloro-5-[4-(difluoromethyl)-4,5-dihydro-3-methyl-5-oxo-1*H*-1,2,4-triazol-1-yl]phenyl]methanesulfonamide) and its major metabolite 3-hydroxymethyl sulfentrazone (N-[2,4-dichloro-5-[4-(difluoromethyl)-4,5-dihydro-3-hydroxymethyl-5-oxo-1*H*-1,2,4-triazol-1-yl]phenyl] methanesulfonamide) on soybeans and rotational crops. For residues on the primary crop, the petitioner has proposed the following tolerance (expressed as the combined residues parent plus the metabolite 3-hydroxymethyl sulfentrazone):

Soybean Seed -- 0.05 ppm

For residues in rotational crops (inadvertent residues), the petitioner has proposed the following tolerances (expressed as the combined residues of parent plus the metabolites 3-hydroxymethyl sulfentrazone and 3-desmethyl sulfentrazone [N-[2,4-dichloro-5-[4-(difluoromethyl)-4,5-dihydro-5-oxo-1*H*-1,2,4-triazol-1-yl]phenyl]methanesulfonamide]):

Under § 408

Cereal Grains (excluding sweet corn), Forage	--	0.1 ppm
Cereal Grains (excluding sweet corn), Straw	--	0.2 ppm
Cereal Grains (excluding sweet corn), Hay	--	0.2 ppm
Cereal Grains (excluding sweet corn), Grain	--	0.1 ppm
Cereal Grains (excluding sweet corn), Stover	--	0.1 ppm

Under § 409

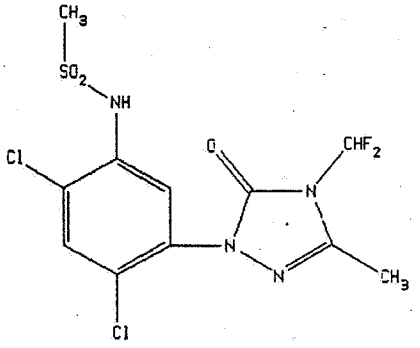
Cereal Grains (excluding sweet corn), Bran	--	0.2 ppm

Under § 701

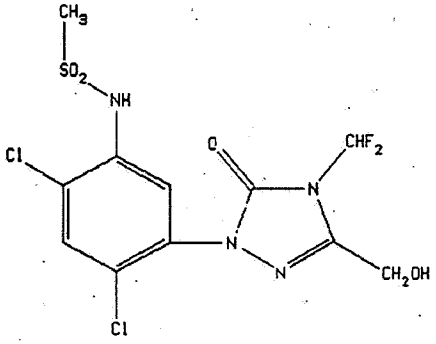
Rice Hulls	--	0.5 ppm
Rice Bran	--	0.2 ppm

The current amendment addresses deficiencies identified in CBTS's previous review (Memo, G. Kramer 7/1/96).

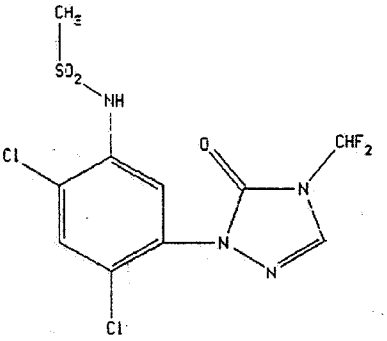
The structures of sulfentrazone and its metabolites are shown below:



Sulfentrazone



3-Hydroxymethyl Sulfentrazone



3-Desmethyl Sulfentrazone

Executive Summary of Chemistry Deficiencies for Time-Limited Tolerances

- DRES run.

Executive Summary of Chemistry Deficiencies for Permanent Tolerances

- Need new enforcement method for soybeans and rotational crops.
- Analysis of selected field residue samples with new method.
- Radiovalidation of new analytical method for plants.
- ILV of new analytical method for plants.
- Agency validation of new analytical method for plants.
- Revised Section F.
- Wheat processing study.
- Additional rice residue data.
- Residue data for sorghum aspirated grain fractions.
- May need animal feeding studies.

RECOMMENDATIONS

Provided that the requested worst-case DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, CBTS will recommend in favor of the proposed time-limited tolerances. CBTS continues to recommend against permanent tolerances for residues of sulfentrazone its metabolites on soybeans, cereal grain RACs and processed commodities for reasons detailed in conclusions 3b, 4b, 5b, and 6 below; and in conclusions 1c, 8a, 8b, and 10b from Memo, G. Kramer 7/1/96.

CBTS requests that a DRES run be performed using the following residue levels:

Cereal Grains (excluding sweet corn), Grain	--	1.0 ppm
Cereal Grains (excluding sweet corn), Bran	--	8.0 ppm
Soybean Seed	--	0.5 ppm
Milk	--	0.025 ppm
Eggs	--	0.025 ppm
Meat, Meat By-products, & Fat*	--	0.025 ppm

Drinking Water	--	0.05 ppm

*of cattle, sheep, hogs, poultry and horses

As this run will represent a worst-case scenario, the above values should be used for both chronic and acute risks.

CONCLUSIONS

1a. The petitioner has proposed that time-limited tolerances be established while a new enforcement method is developed and samples from the residue trials are reanalyzed. This proposal was supported by a DRES run performed by the petitioner in which "10X" and "50X" scenarios produced dietary risks well below the RfD in the most highly exposed subgroup. In the 10X scenario, residues were assumed to be 10X the level of the proposed tolerances and meat and milk were assumed to be at the projected level of an analytical enforcement method (0.025 ppm). In the 50X scenario, residues were assumed to be 50X the level of the proposed tolerances and meat and milk were assumed to be at twice the level of an analytical enforcement method (0.050 ppm). Levels in drinking water were assumed to be 0.05 ppm in both scenarios.

1b. CBTS considers this proposal to be reasonable provided that the DRES run produced by RCAB also results in a low dietary risk. As the recovery of residues in the radiovalidation study was 32% of that expected, the 10X scenario provides an adequate margin of safety. CBTS will thus request that a worst-case DRES run be performed. If this DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances.

2. The petitioner previously submitted the results of nine rotational rice trials. This number does not correspond to that required for rice as a representative commodity of the cereal grains crop group. CBTS concludes that an additional four rice field trials are required. If the worst-case DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances while the requested data are generated.

3a. The proposed tolerances have been revised from rice as an individual crop to a crop group tolerance on cereal grains (except sweet corn). Also included were proposed § 701 MRLs for rice bran and hulls and a proposed § 409 tolerance for cereal grain bran.

3b. The revised Section F is appropriate for time-limited tolerances and MRLs. A conclusion on the appropriate levels for

permanent tolerances and MRLs will be withheld pending submission and review of additional data.

4a. The petitioner has revised labels for Authority 4F and 75DF in which all plantback intervals of 1 year or less were removed except for soybeans and cereal grains.

4b. Residue data are available for all representative commodities of the cereal grains (except sweet corn) crop group (see below). The revised Section B is thus appropriate for time-limited tolerances and conditional registration of Authority 4F and 75DF. A conclusion on the appropriate plantback restrictions for the permanent tolerances and the unconditional registrations will be withheld pending submission and review of additional data.

5a. The petitioner has provided the results of nine grain sorghum trials, conducted in Regions 2 (1 trial), 4 (1 trial), 5 (5 trials), 6 (1 trial) and 8 (1 trial). This regional distribution does not correspond to that required for grain sorghum as a representitive commodity of the cereal grains crop group, but does correlate well with the areas where soybeans are grown. CBTS thus concludes that the number and location of grain sorghum trials are adequate to set tolerances on cereal grain RACs when planted in rotation with the primary crop soybeans. In grain sorghum, the total of sulfentrazone and its metabolites was a maximum of 0.040 ppm in forage, 0.045 ppm in fodder, and 0.009 ppm in grain.

5b. These results support the proposed time-limited tolerances for cereal grains (except sweet corn). However, a final conclusion on the appropriate levels for permanent tolerance will be withheld pending reanalysis of field residue samples with the new enforcement method.

6. CBTS will reevaluate the need for a cow feeding study once the appropriate tolerance levels are determined for soybeans and rotational crops by reanalysis of field residue samples with the new enforcement method and submission of additional residue data and processing studies.

DETAILED CONSIDERATIONS

Deficiency - Conclusion 1b (from Memo, G. Kramer 7/1/96)

1b. The total of sulfentrazone and its metabolites in/on wheat was a maximum of 0.088 ppm in forage, 0.055 ppm in hay, 0.012 ppm in grain, and 0.115 ppm in straw. Based on these results, the appropriate tolerances for sulfentrazone and its metabolites are 0.10 ppm in wheat forage, 0.10 ppm in hay, 0.05 ppm in grain, and 0.15 ppm in straw. However, a final conclusion on the appropriate tolerance

levels will be withheld pending reanalysis of field residue samples with the new enforcement method (see conclusion 8a).

Petitioner's Response: The petitioner has proposed that time-limited tolerances be established while the new method is developed and the samples are reanalyzed. This proposal is supported by a DRES analysis performed by the petitioner in which "10X" and "50X" scenarios produced dietary risks well below the RfD in the most highly exposed subgroup. In the 10X scenario, residues were assumed to be 10X the level of the proposed tolerances and meat and milk were assumed to be at the projected level of an analytical enforcement method (0.025 ppm). In the 50X scenario, residues were assumed to be 50X the level of the proposed tolerances and meat and milk were assumed to be at twice the level of a typical analytical enforcement method (0.050 ppm). Levels in drinking water were assumed to be 0.05 ppm in both scenarios.

CBTS's Conclusion: CBTS considers this proposal to be reasonable provided that the DRES run produced by RCAB also results in a low dietary risk. As the recovery of residues in the radiovalidation study was 32% of that expected, the 10X scenario provides an adequate margin of safety. CBTS will thus request that a worst-case DRES run be performed using the following residue levels:

Cereal Grains (excluding sweet corn), Grain	--	1.0 ppm
Cereal Grains (excluding sweet corn), Bran	--	8.0 ppm
Soybean Seed	--	0.5 ppm
Milk	--	0.025 ppm
Eggs	--	0.025 ppm
Meat, Meat By-products, & Fat*	--	0.025 ppm
Drinking Water	--	0.05 ppm

*of cattle, sheep, hogs, poultry and horses

If this DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances. Note that the worst-case estimate for bran is based on the 1 ppm value and the theoretical maximum concentration factor for wheat bran (7.7X). In the absence of a wheat processing study, the theoretical maximum concentration must be assumed.

Deficiency - Conclusion 1c (from Memo, G. Kramer 7/1/96)

1c. The petitioner previously requested a data waiver for the wheat processing study. As residues of sulfentrazone and its metabolites were nondetectable in grain samples from the first five limited field trials, CBTS conditionally recommended in favor of this data waiver request pending resolution of all deficiencies related to the proposed wheat tolerances (Memo, G. Kramer 7/26/95). However, in the residue data submitted with this amendment, detectable residues were found in grain in over one half of the trials. CBTS thus concludes that a

wheat processing study will be required for this petition. If concentration of residues is observed in bran, then residue data should also be provided for wheat aspirated grain fractions.

Petitioner's Response: The petitioner has proposed that time-limited tolerances be established while the requested study is performed.

CBTS's Conclusion: If the worst-case DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances while the requested data are generated.

Deficiency - Conclusion 3b (from Memo, G. Kramer 7/1/96)

3b. The total of sulfentrazone and its metabolites in/on corn was a maximum of 0.060 ppm in forage, 0.015 ppm in grain and 0.028 ppm in fodder. Based on these results, the appropriate tolerances for sulfentrazone and its metabolites are 0.10 ppm in field corn forage, 0.05 ppm in grain, and 0.05 ppm in stover. However, a final conclusion on the appropriate tolerance levels will be withheld pending reanalysis of field residue samples with the new enforcement method (see conclusion 8a).

Petitioner's Response: The petitioner has proposed that time-limited tolerances be established while the requested study is performed.

CBTS's Conclusion: If the worst-case DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances while the requested data are generated.

Deficiency - Conclusion 5 (from Memo, G. Kramer 7/1/96)

5. The petitioner previously submitted the results of 4 rotational rice trials (Memo G. Kramer 9/19/95). Together with the residue data submitted with this amendment, the petitioner has provided the results of 9 rice trials. The number and regional distribution of these trials does not correspond to that required for rice as a primary crop. CBTS thus concludes that an additional 7 rice field trials are required. Conclusions on the adequacy of the proposed tolerances will be withheld pending submission and review of additional residue data.

Petitioner's Response: The proposed tolerances have been revised from rice as an individual crop to a crop group tolerance on cereal grains (except sweet corn). The petitioner has proposed that these time-limited tolerances be established while an additional four rice field trials are performed.

CBTS's Conclusion: The petitioner previously submitted the results of nine rotational rice trials. This number does not correspond to

that required for rice as a representative commodity of the cereal grains crop group. CBTS concludes that an additional four rice field trials are required. If the worst-case DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances while the requested data are generated.

Deficiency - Conclusion 6 (from Memo, G. Kramer 7/1/96)

6. Total residues of sulfentrazone and its metabolites were found to concentrate in rice hulls (3.9X) and bran (1.9X). The petitioner has proposed tolerances for these commodities. However, these feed items are not ready-to-eat. As the dilution factors used to calculate the residues in a ready-to-eat diet (5X for rice hulls and 4X for rice bran) exceed observed concentration factors, Section 701 MRLs will be required for rice bran and hulls. Once adequate residue data are available to set tolerances on rice RACs, a proposal for Section 701 MRLs should be submitted for rice bran and hulls. A conclusion on the appropriate levels for these MRLs will be withheld pending submission and review of the additional residue data.

Petitioner's Response: The proposed tolerances have been revised from rice as an individual crop to a crop group tolerance on cereal grains (except sweet corn). Also included were proposed § 701 MRLs for rice bran and hulls and a proposed § 409 tolerance for cereal grain bran.

CBTS's Conclusion: The revised Section F is appropriate for time-limited tolerances and MRLs. A conclusion on the appropriate levels for permanent tolerances and MRLs will be withheld pending submission and review of additional data.

Deficiency - Conclusion 7 (from Memo, G. Kramer 7/1/96)

7. The revised labels for Authority 4F and 75DF still contain crop rotation restrictions of 12 months or less for crops for which residue data has not been provided (10 months for sorghum and 12 months for alfalfa, barley, dry beans, peanuts, sunflowers, tobacco, and sugarcane). The petitioner has justified the barley restriction by stating that this crop will be covered by a crop group tolerance. However, neither a tolerance for the cereal grains group has been proposed nor has residue data been submitted for all of the representative commodities (sweet corn, field corn, rice, grain sorghum and wheat). Based on the residue data submitted, all plantback intervals of 1 year or less should be removed from the sulfentrazone label except for soybeans, wheat and field corn.

Petitioner's Response: Revised labels for Authority 4F and 75DF in which all plantback intervals of 1 year or less were removed except for soybeans and cereal grains have been submitted. The proposed tolerances have been revised from rice as an individual crop to a crop group tolerance on cereal grains (except sweet corn).

CBTS's Conclusion: Residue data are available for all representative commodities of the cereal grains (except sweet corn) crop group (see below). The revised Section B is thus appropriate for time-limited tolerances and conditional registration of Authority 4F and 75DF. A conclusion on the appropriate plantback restrictions for permanent tolerances and unconditional registration will be withheld pending submission and review of additional data.

Deficiency - Conclusion 8a (from Memo, G. Kramer 7/1/96)

8a. The petitioner has developed a streamlined method (P-3063M, MRID# 440056-01) which simultaneously measures all three analytes in rotational crops. This method is also very similar to the analytical enforcement method for soybeans. However, in a recent meeting with representatives of FMC, CBTS was informed that the current methodology fails to release a significant portion of the conjugated 3-hydroxymethyl sulfentrazone. The petitioner is in the process of developing a new enforcement method for soybeans and rotational crops. The revised method will be submitted along with an ILV. CBTS will then initiate a PMV. The petitioner has also agreed to reanalyze selected field samples of every RAC associated with this petition using the new method. At least six samples of each RAC will be analyzed, including those which contained the greatest residues when analyzed with the previous methods. Supporting storage stability data will also be provided.

Petitioner's Response: The petitioner has proposed that time-limited tolerances be established while the new method is developed and the samples are reanalyzed.

CBTS's Conclusion: If the worst-case DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances while the requested data are generated.

Deficiency - Conclusion 8b (from Memo, G. Kramer 7/1/96)

8b. Radiovalidation of the new enforcement method for soybeans and rotational crops will be required.

Petitioner's Response: The petitioner has proposed that time-limited tolerances be established while the requested study is performed.

CBTS's Conclusion: If the worst-case DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances while the requested data are generated.

Deficiency - Conclusion 9 (from Memo, G. Kramer 7/1/96)

9. In the labels submitted with this amendment, the phrase "Do not graze treated fields or harvest for forage or hay" has been added to the "Directions for Use" portion of the labels. As this restriction actually applies only to soybeans (both primary and rotational), it should be modified to "Do not feed treated soybean forage or soybean hay to livestock" and be included in both the "Directions for Use" and "Rotational Crop Guidelines" portions of the labels. **A revised Section B is required.**

Petitioner's Response: Revised labels for Authority 4F and 75DF in which this phrase has been added to both the "Directions for Use" and "Rotational Crop Guidelines" portions of the labels have been submitted.

CBTS's Conclusion: Section B has been revised as requested. This deficiency is resolved.

Deficiency - Conclusion 10a (from Memo, G. Kramer 7/1/96)

10a. The proposed rice and sorghum tolerances should be withdrawn as there are insufficient residue data available for these crops. Also, the corn tolerances should be expressed as "corn, field, grain; corn, field, stover; and corn, field, forage." **A revised Section F is required.**

Petitioner's Response: The proposed tolerances have been revised from rice and grain sorghum as individual crops to a crop group tolerance on cereal grains (except sweet corn). The petitioner has proposed that these time-limited tolerances be established while an additional four rice trials are performed. Residue data for grain sorghum have also been provided:

> Field Accumulation Studies on Rotational Crops: Magnitude of the Residue of Sulfentrazone and its Metabolites in/on Sorghum as a Rotated Crop Following Harvest of Soybeans Treated with Authority (Sulfentrazone) at 0.375 Pounds Active per Acre. MRID# 439268-10.

A total of nine rotational field trials were conducted in the states of VA, LA, MO, TX (2), NE, KS, SD and IA in 1994/95. Authority 75DF or 80WP was applied at a rate of 0.375 lbs. ai/A (1X). Soybeans were planted, grown and harvested. Rotational grain sorghum was planted 9-13 months after sulfentrazone application. Sorghum forage was harvested 86-124 days after planting; and sorghum grain and fodder, 112-153 days after planting. After harvest, samples were stored frozen until analysis. The maximum storage interval was 3 months. The proposed enforcement method was used for residues of sulfentrazone, 3-hydroxymethyl sulfentrazone and 3-desmethyl sulfentrazone (see Memo, G. Kramer 4/3/95 for review). The method was validated in sorghum forage, fodder and grain at 0.025 ppm. The average

recovery for sulfentrazone was 94 ± 14% (n=26); for 3-desmethyl sulfentrazone, 105 ± 15% (n=26); and for 3-hydroxymethyl sulfentrazone, 88 ± 17% (n=26). Analyses of the treated samples showed that the total of sulfentrazone and its metabolites were a maximum of 0.040 ppm in forage, 0.045 ppm in fodder, and 0.009 ppm in grain (Table 1).

CBTS's Conclusion: The petitioner has provided the results of nine grain sorghum trials, conducted in Regions 2 (1 trial), 4 (1 trial), 5 (5 trials), 6 (1 trial) and 8 (1 trial). This regional distribution does not correspond to that required for grain sorghum as a representitive commodity of the cereal grains crop group, but does correlate well with the areas where soybeans are grown. CBTS thus concludes that the number and location of grain sorghum trials are adequate to set tolerances on cereal grain RACs when planted in rotation with the primary crop soybeans. In grain sorghum, the total of sulfentrazone and its metabolites was a maximum of 0.040 ppm in forage, 0.045 ppm in fodder, and 0.009 ppm in grain.

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Table 1- Results of limited field trials grain sorghum in which Sulfentrazone 75DF or 80WP was applied to the primary crop at a rate of 0.375 lbs. ai/A. Values of 0.005-0.025 ppm are above the LOD, but below the LOQ.

Site	Form.	MAT[1]	RAC	Crop Age (Days)	Maximum Residue (ppm)			
					Sulfen.	DMS	HMS	Total
VA	80WP	13	Forage	89	ND	0.017	0.010	0.027
			Fodder	130	ND	0.012	0.006	0.018
			Grain	130	ND	0.009	ND	**0.009**
LA	75DF	10	Forage	100	ND	ND	0.008	0.008
			Fodder	130	ND	0.006	0.009	0.015
			Grain	130	ND	ND	0.006	0.006
TX	75DF	9	Forage	89	ND	0.016	0.024	**0.040**
			Fodder	112	ND	0.022	0.023	**0.045**
			Grain	112	ND	0.007	ND	0.007
TX	75DF	11	Forage	124	ND	ND	0.019	0.019
			Fodder	153	0.009	0.012	0.021	0.042
			Grain	153	ND	ND	ND	ND
MO	75DF	11	Forage	108	ND	ND	0.011	0.011
			Fodder	138	ND	ND	0.008	0.008
			Grain	138	ND	ND	ND	ND
NE	75DF	11	Forage	86	ND	ND	0.008	0.008
			Fodder	124	ND	ND	0.018	0.018
			Grain	124	ND	ND	ND	ND
KS	75DF	11	Forage	96	ND	ND	ND	ND
			Fodder	133	ND	0.012	0.013	0.025
			Grain	133	ND	ND	ND	ND
SD	75DF	12	Forage	80	ND	ND	0.010	0.010
			Fodder	135	ND	ND	0.005	0.005
IA	75DF	10	Forage	98	ND	ND	0.007	0.007
			Fodder	152	ND	ND	0.010	0.010
			Grain	152	ND	ND	ND	ND

[1]Months after treatment of soil with sulfentrazone when wheat was planted
ND = Not Detected; i.e., below the LOD (0.005 ppm for sulfentrazone, HMS and DMS).
NA = Not Analyzed, and NS = Not Sampled
HMS = Hydroxy Methyl Sulfentrazone
DMS = Des-Methyl Sulfentrazone

Deficiency - Conclusion 10b (from Memo, G. Kramer 7/1/96)

10b. If residue data are submitted for grain sorghum, then data should also be provided for sorghum aspirated grain fractions as concentration of residues has been observed in the bran of another cereal grain (rice).

Petitioner's Response: The petitioner has proposed that time-limited tolerances be established while the requested study is performed.

CBTS's Conclusion: If the worst-case DRES run results in a dietary risk which is less than 100% of the RfD for all subgroups, then CBTS will recommend in favor of the proposed time-limited tolerances while the requested data are generated.

Deficiency - Conclusion 11 (from Memo, G. Kramer 7/1/96)

11. CBTS will reevaluate the need for a cow feeding study once the appropriate tolerance levels are determined for soybeans and rotational crops by reanalysis of field residue samples with the new enforcement method.

Petitioner's Response: The petitioner has agreed to perform feeding studies if reanalysis of the field trial samples result in higher tolerances which trigger the need for such studies.

CBTS's Conclusion: CBTS will reevaluate the need for a cow feeding study once the appropriate tolerance levels are determined for soybeans and rotational crops by reanalysis of field residue samples with the new enforcement method and submission of additional residue data and processing studies.

cc: PP#4F04407, Kramer, Circ., R.F., J. Miller/D. Morgan (PM Team 23, RD, 7505C)
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