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PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

DATE: February 28, 2002

SUBJECT: **Metolachlor and *S*-Metolachlor** Residue Chemistry Chapter for the Tolerance Reassessment Eligibility Decision (TRED); PC codes 108801 and 108800; DP Barcode D274328; Rereg. Case 0001.

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THROUGH: Alan Nielsen, Branch Senior Scientist A. Nielsen 2/28/02
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and

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TO: Christina Jarvis, Environmental Protection Specialist
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INTRODUCTION

Metolachlor [2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide] and *S*-metolachlor [*S*-2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide] are selective, chloroacetanilide herbicides that are applied to a variety of crops as a preplant, preplant-incorporated (PPI), pre-emergence, or post-emergence-directed application, primarily for the control of grass weeds. Metolachlor is currently registered to Syngenta Crop Protection, Inc., under the trade names Dual® and Bicep®, for use on corn, cotton, legume vegetables, peanuts, potatoes, sorghum, safflower, nonbearing citrus and grapes, stone fruits and trees nuts. Metolachlor formulations registered to Syngenta for use on these crops include emulsifiable concentrate (EC) and granular (G) formulations. S-metolachlor is also currently registered to Syngenta Crop Protection, Inc., for use on corn, cotton, legume vegetables, peanuts, potatoes,

safflower, and sorghum, with the intent of replacing the racemic mixture of metolachlor. *S*-Metolachlor formulations registered to Syngenta for use on these crops include emulsifiable concentrate (EC), granular (G), flowable concentrate (FlC) and ready-to-use (RTU) formulations under the trade names Dual Magnum®, Bicep Magnum®, Broadstrike Dual Magnum®, Medal®, and Boundry®. Following the registration of *S*-metolachlor, Syngenta has requested the cancellation of its metolachlor technical and end-use products, and the tolerances be revoked (*FR Vol. 64, 72343, 12/27/99*); however, until the Agency makes a decision regarding Cedar Chemical's metolachlor "me-too" registration, and/or until the tolerances for metolachlor are revoked, the Agency will proceed with a tolerance reassessment decision for metolachlor. The Agency notes, however, that since the use pattern of *S*-metolachlor is identical to that of metolachlor, and since the Agency has determined that *S*-metolachlor has either comparable or decreased toxicity as compared to metolachlor, this document is reflective of *S*-metolachlor as well.

Tolerances for residues of metolachlor in or on plant and livestock commodities are currently expressed in terms of the combined residues (free and bound) of the herbicide metolachlor and its metabolites, determined as the derivatives, 2-[(2-ethyl-6-methylphenyl)amino]-1-propanol (CGA-37913) and 4-(2-ethyl-6-methylphenyl)-2-hydroxy-5-methyl-3-morpholinone (CGA-49751), each expressed as the parent compound [40 CFR §180.368(a) and 40 CFR §180.368(c)]. Tolerances for metolachlor presently cover residues resulting from the use of *S*-metolachlor.

Attached is the residue chemistry chapter for the TRED for the selective, pre-emergence, chloroacetanilide herbicides metolachlor and *S*-metolachlor. Several submissions of data have been received since the most recent addendum (10/4/94) to the Metolachlor reregistration eligibility decision (RED). The information contained in this document outlines the current Residue Chemistry Science Assessments with respect to the tolerance reassessment of metolachlor and *S*-metolachlor. This information was compiled by Dynamac Corporation under supervision of RRB2. This review has undergone secondary review by RRB2 and has been revised to reflect current Agency policies.

EXECUTIVE SUMMARY OF CHEMISTRY DEFICIENCIES

- Residue data supporting the use of *S*-metolachlor (EC) on cabbage are required and the registrant should pursue a section 3 registration for *S*-metolachlor on cabbage.
- Residue data on corn aspirated grain fractions are required for both metolachlor and *S*-metolachlor.
- A revised Section F proposing appropriate tolerances for metolachlor residues in/on grass forage and grass hay should be submitted.
- Residue data supporting shelled, succulent peas, and beans are required.
- Label amendments are required for both metolachlor and *S*-metolachlor use on legume vegetable foliage.

- Residue data supporting the use of *S*-metolachlor (EC) on dry bulb onions are required and the registrant should pursue a section 3 registration for *S*-metolachlor on onion.
- Label amendments are required for both metolachlor and *S*-metolachlor use on peanut.
- Additional residue data supporting bell peppers are required.
- Residue data on sorghum aspirated grain fractions are required for both metolachlor and *S*-metolachlor.
- Residue data on soybean aspirated grain fractions are required for both metolachlor and *S*-metolachlor.
- Label amendments are required for both metolachlor and *S*-metolachlor use on soybean.
- Label amendments are required for metolachlor (EC) use on spinach. If the petitioner intends to support the 3.0 lb ai/A seasonal rate, then data would be required reflecting pre-emergence applications at 1.0 lb ai/A/crop to three successive spinach crops.
- Label amendments are required for metolachlor use on stone fruits.
- The registrant must provide copies of labels including the proposed use on tomatoes.
- Label amendments are required for metolachlor use on tree nuts.
- Additional data are required characterizing the ^{14}C-residues in rotated crops, along with information on the percentage of the ^{14}C-residues measured by the current enforcement method, supporting storage stability data, and sample storage conditions and intervals.
- Residue data are required depicting residues in/on representative rotated cereal grains planted 4.5 months following a single application of metolachlor at the maximum rate for corn.
- Analytical grade reference standards are required as requested by the repository for metolachlor, *S*-metolachlor, and all metabolites of concern.

PENDING PETITIONS

The Agency acknowledges that there are pending tolerance petitions for asparagus, carrots, grass forage and hay, peppers, rhubarb, sugar beets, sunflowers, and Swiss chard that are not included in this assessment. These petitions will be reviewed by the Agency in the future.

RECOMMENDATIONS

Tolerances for metolachlor currently cover residues of *S*-metolachlor on the same commodities for the same use pattern when the maximum use rate of *S*-metolachlor is 0.63x the use rate of metolachlor. Separate tolerances should be established in a separate section under §180.368 for *S*-metolachlor. Tolerances for metolachlor should be listed under §180.368(a)(1) through (d)(1), and tolerances for *S*-metolachlor should be listed under §180.368(a)(2) through (d)(2). A summary of the tolerance reassessment and recommended modifications in commodity definitions for metolachlor and *S*-metolachlor are presented in Tables 4a and 4b in the attached residue chemistry chapter, respectively.

Tolerances for metolachlor and *S*-metolachlor on corn forage and stover, peanut nutmeat and hay, nongrass livestock feeds, sorghum forage, and soybean forage should be lowered, and tolerances on sorghum stover, spinach, eggs, fat, meat and meat byproducts of poultry, and the fat, meat, and meat byproducts (excluding kidney) of cattle, goats, horse, and sheep should be increased.

Current tolerances on seed and pod vegetables (excluding soybean) should be replaced by separate tolerances for the crop subgroups for edible-podded legume vegetables, dried shelled peas and beans (except soybean), and succulent shelled peas and beans. A separate tolerance also should be established for metolachlor use on soybean hulls.

Tolerances on peanut forage, rice forage, milo commodities, liver of livestock and poultry, and all hog commodities should be revoked.

Tolerances for residues of metolachlor in/on commodities of barley, buckwheat, millet, oats, rice, rye, wheat, and the nongrass livestock feeds group were initially established to cover residues of metolachlor in these crops when they were planted as rotational crops following a primary crop that was treated with metolachlor; however, tolerances on these crops are currently listed in 40 CFR §180.368(a). The tolerances on these crops should be reassigned to 40 CFR §180.368(d) which is reserved for indirect or inadvertent residues.

cc: Sherrie L. Kinard (RRB2), Metolachlor Reg. Std. File, Metolachlor Subject File, RF, LAN. RD/I: Metolachlor Team Review (02/13/02), Chemistry Science Advisory Council (02/13/02), A. Nielson (02/28/02).

7509C: RRB2: S. Kinard: CM#2:Rm 722B: 703-305-0563: 02/28/02.

METOLACHLOR AND *S*-METOLACHLOR

TOLERANCE REASSESSMENT ELIGIBILITY DECISION

RESIDUE CHEMISTRY CONSIDERATIONS

PC Codes 108801 (Case No. 0001) and PC Code 108800

(DP BARCODE D274328)

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METOLACHLOR AND *S*-METOLACHLOR

TOLERANCE REASSESSMENT ELIGIBILITY DOCUMENT

RESIDUE CHEMISTRY CONSIDERATIONS

PC Code 108801 (Case No. 0001) and PC Code 108800

A. INTRODUCTION

Metolachlor [2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide] and *S*-metolachlor [*S*-2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide] are selective, pre-emergence, chloroacetanilide herbicides that are applied to a variety of crops as a preplant, preplant-incorporated (PPI), pre-emergence, or post-emergence-directed application, primarily for the control of grass weeds. Metolachlor is currently registered to Syngenta Crop Protection, Inc., under the trade names Dual® and Bicep®, for use on corn, cotton, legume vegetables, peanuts, potatoes, sorghum, safflower, nonbearing citrus and grapes, stone fruits and trees nuts. Metolachlor formulations registered to Syngenta for use on these crops include emulsifiable concentrate (EC) and granular (G) formulations. S-metolachlor is also currently registered to Syngenta Crop Protection, Inc., for use on corn, cotton, legume vegetables, peanuts, potatoes, safflower, and sorghum, with the intent of replacing the racemic mixture of metolachlor. *S*-Metolachlor formulations registered to Syngenta for use on these crops include EC, G, flowable concentrate (FlC) and ready-to-use (RTU) formulations under the trade names Dual Magnum®, Bicep Magnum®, Broadstrike Dual Magnum®, Medal®, and Boundry®. Following the registration of *S*-metolachlor, Syngenta has requested the cancellation of its metolachlor technical and end-use products, and the tolerances be revoked(*FR Vol. 64, 72343, 12/27/99*); however, until the Agency makes a decision regarding Cedar Chemical's metolachlor "me-too" registration, and/or until the tolerances for metolachlor are revoked, the Agency will proceed with a tolerance reassessment decision for metolachlor. The Agency notes, however, that since the use pattern of s-metolachlor is identical to that of metolachlor, and since the Agency has determined that s-metolachlor has either comparable or decreased toxicity as compared to metolachlor, this document is reflective of s-metolachlor as well.

Metolachlor is a List A reregistration chemical and was the subject of a Registration Standard dated 9/80, a Final Registration Standard and Tolerance Reassessment (FRSTR) dated 1/87, a Registration Standard Followup (Update) dated 6/14/89, and Product and Residue Chemistry Chapters for the Reregistration Eligibility Document (RED) dated 6/28/93. Several addendums to the RED have also been issued updating the Residue Chemistry Chapter of the RED (D201438, S. Hummel, 6/23/94; D206103, D. Miller, 9/13/94; D204467, S. Hummel, 9/29/94; and D207867, S. Hummel, 10/4/94). These documents summarized the regulatory conclusions on the available residue chemistry data and specified that additional data were required for reregistration purposes. Several submissions of data have been received since the most recent

addendum (10/4/94) to the Metolachlor RED. The information contained in this document outlines the current Residue Chemistry Science Assessments with respect to the tolerance reassessment of metolachlor and *S*-metolachlor.

Tolerances for residues of metolachlor in or on plant and livestock commodities are currently expressed in terms of the combined residues (free and bound) of the herbicide metolachlor and its metabolites, determined as the derivatives, 2-[(2-ethyl-6-methylphenyl)amino]-1-propanol (CGA-37913) and 4-(2-ethyl-6-methylphenyl)-2-hydroxy-5-methyl-3-morpholinone (CGA-49751), each expressed as the parent compound. Permanent tolerances for residues in/on plant commodities range from 0.1 ppm in/on a variety of plant commodities to 30 ppm in/on peanut forage and hay [40 CFR §180.368(a)]. Permanent tolerances for residues in/on livestock commodities range from 0.02 ppm in milk, egg, fat, and meat and meat-byproducts (except liver and kidney) to 0.2 ppm in kidney [40 CFR §180.368(a)]. Temporary tolerances have been established on grass forage and hay, spinach, tomatoes, and tomato puree and paste [40 CFR §180.368(b)], and tolerances with regional registrations have also been established for residue in/on dry bulb onions and non-bell peppers [40 CFR §180.368(c)]. **Tolerances for metolachlor presently cover residues resulting from the use of *S*-metolachlor.** Adequate enforcement methods are available for the determination of these residues.

B. USE PATTERN SUMMARY

1. Product Lists

A search of the Agency's Reference Files System (REFS) indicates that there are four metolachlor end-use products (EPs) and eleven *S*-metolachlor EPs registered to Syngenta Crop Protection, Inc. that have uses on food and/or feed crops (Tables 1a and 1b). All four of the metolachlor EPs are EC formulations, and one is a multiple active ingredient (MAI) product, which also contains atrazine at 2.67 lb/gal [EPA Reg No. 100-710]. Of the eleven *S*-metolachlor EP formulations, eight are ECs, one is a FlC, one is a G, and one is a RTU. Five of the *S*-metolachlor EPs are MAIs that also contain either atrazine at 2.7-3.1 lb/gal [EPA Reg Nos. 100-817, -826 and -886], atrazine at 2 lb/gal and flumetsulam at 0.09 lb/gal [EPA Reg. No. 100-928], or metribuzin at 1.5 lb/gal [EPA Reg. No. 100-958].

There are also a total of 34 SLN Labels with food/feed uses that are associated with the 7.6 lb/gal EC formulation of *S*-metolachlor [EPA Reg. No. 100-816]; these SLNs include uses on alfalfa, cabbage, celery, cotton, meadowfoam, onions, peaches, peppers, and radishes.

A notice of cancellation (*FR Vol. 66, 38676, 7/25/01*) was recently issued for two metolachlor EPs, a 25% G [EPA Reg. No. 100-712] and a 3.2 lb/gal EC [EPA Reg. No. 100-766], and for a S-metolachlor EP, a 7.3 lg/gal EC [EPA Reg. No. 100-947]; therefore these products were excluded from this report.

Table 1a. Metolachlor EPs with Uses on Feed/Food Crops Registered to Syngenta Crop Protection, Inc.

EPA Reg No.	Label Acceptance Date	Formulation Class	Product Name
100-597	4/98	8 lb/gal EC	Dual 8E Herbicide
100-673	4/98	8 lb/gal EC	Dual Herbicide
100-710 [a]	2/98	3.2 lb/gal EC	Bicep II Herbicide
100-711	4/98	7.8 lb/gal EC	Dual II Herbicide

[a] This EP is a MAI product that also contains atrazine at 2.67 lb/gal.

Table 1b. *S*-Metolachlor EPs with Uses on Feed/Food Crops Registered to Syngenta Crop Protection, Inc.

EPA Reg No.	Label Acceptance Date	Formulation Class	Product Name
100-816 [a]	6/00	7.6 lb/gal EC	Dual Magnum Herbicide
100-817 [b]	6/00	2.4 lb/gal FIC	Bicep II Magnum Herbicide
100-818	6/00	7.6 lb/gal EC	Dual II Magnum Herbicide
100-827 [b]	6/00	3.3 lb/gal EC [c]	Bicep Lite II Magnum Herbicide
100-829	6/00	6.3 lb/gal RTU	Dual II Magnum SI Herbicide
100-886 [b]	2/98	2.4 lb/gal EC	Bicep Magnum
100-910	6/00	16% G	Dual II Magnum Granular Herbicide
100-928 [d]	6/00	2.5 lb/gal EC	Bicep Magnum TR Herbicide
100-958 [e]	6/00	6.3 lb/gal EC	Boundary Herbicide
100-964	9/00	7.6 lb/gal EC	Medal Herbicide
100-965	9/00	7.6 lb/gal EC	Medal II Herbicide

[a] Includes 34 SLN labels with food/feed uses on a variety of crops (SLN Nos. CO990002, DE990001, FL990006, FL990007, FL990008, ID990016, KY990001, KY990002, LA990013, MA990002, MN000001, NJ990004, NJ990005, NJ990011, NM000001, NM990002, NV990006, NY990001, OH990001, OR990011, OR9900027, OR990035, OR990042, PA990003, TX990008, TX990009, UT000002, VA990001, VA990002, WA990005, WA990023, WI990007, WI990008 and WI990009).

[b] These EP are MAI products that also contains 2.7-3.1 lb/gal of atrzine.

[c] REFS listed this formulation as an RTU, but it appears to be an EC.

[d] This EP is a MAI product that also contains 0.09 lb/gal of flumetsulam and 2.0 lb/gal of atrazine.

[e] This EP is a MAI product that also contains 1.5 lb/gal of metribuzin.

2. Use Pattern Tables

A comprehensive summary of the registered use patterns of metalachlor and *S*-metolachlor are presented in Tables 2a and 2b, respectively, and are based on the product labels registered to Syngenta Crop Protection, Inc. A tabular summary of the residue chemistry science assessments for tolerance reassessment of both metolachlor and *S*-metolachlor are presented in Table 3. The conclusions listed in Table 3 regarding the tolerance reassessment of metolachlor and *S*-metolachlor food/feed uses are based on the use patterns registered by the basic producer, Syngenta Crop Protection, Inc. When end-use product DCIs are developed (e.g., at issuance of the RED), RD should require that all end-use product labels (e.g., MAI labels, SLNs, and products subject to the generic data exemption) be amended such that they are consistent with the basic producer's labels.

A review of the above EP labels and the supporting residue data indicate that the following label changes should be made:

(i) a 30-day PHI should be specified for harvesting sweet corn (K+CWHR).

(ii) a 60-day PHI should be specified for forage of legumes vegetables.

(iii) use directions should prohibit grazing or harvest of soybean forage and hay following the post-emergence use.

(iv) use directions on soybeans should be amended to include a preharvest interval (PHI)/PGI for soybean forage and hay; the available data support a 30-day PHI/PPGI.

(v) use directions on spinach should be amended to specify a maximum seasonal rate of 1.0 lb ai/A and a PHI of 40 days.

(vi) the plant-back interval for planting clover as a rotational crop can be reduced to 4 months.

(vii) use directions for use on stone fruits should be amended to allow only a single application per season.

(viii) use directions for use on tree nuts should be amended to allow only a single application per season.

The Agency (DP Barcode D226780, L. Kutney, 11/12/96) previously indicated that the available residue data for metolachlor would cover residues of *S*-metolachlor provided that the labeled use rates for *S*-metolachlor are ~63% lower than the metolachlor use rates. A comparison of the comparable uses on Syngenta's EP labels verified that the uses rates of *S*-metolachlor are ~63% lower than for metolachlor.

Table 2a. Food/Feed Use Patterns Subject To Tolerance Reassessment for Metolachlor (PC Code 108801).

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Citrus (nonbearing)					
Broadcast application to soil Ground equipment	7.8 lb/gal EC [100-711]	3.9	1	NA	Applications should be made with a minimum of 10 gallons of water/A. Do not apply within 30 days of transplanting nonbearing trees into the grove. Do not apply to trees that will bear harvestable fruit within 12 months of application. Do not graze livestock in treated areas.
Grapes (nonbearing)					
Broadcast application to soil Ground equipment	7.8 lb/gal EC [100-711]	3.9	1	NA	Applications should be made with a minimum of 10 gallons of water/A. Do not apply within 30 days of transplanting new vines into the vineyard. Do not apply to vines that will bear harvestable fruit within 12 months of application. Do not graze livestock in treated areas.

(continued; footnotes follow)

Table 2a. Continued.

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Corn (all types)					
Broadcast application in fall to crop stubble after harvest Ground or aerial equipment	8 lb/gal EC [100-597] [100-673] 7.8 lb/gal EC [100-711]	medium/fine (>2.5% OM) - 3.0 or 3.8 (6-20% OM) - 3.8-4.0	2 or (⅔ + ⅓) +1	NS	The maximum seasonal rate is 5.9-6.0 lb ai/A on all labels except the 25% G, which has a maximum seasonal rate of 3.8 lb ai/A. A 30-day PHI is specified for grazing or feeding of treated forage. The fall application should not be applied to frozen ground, and this use is restricted to IA, MN, ND, SD, WI and portions of NE and IL. The preplant surface application in spring is restricted to the following states: CO, CT, DE, IA, IL, IN, KS, KY, MA, MD, ME, MI, MN, MO, MT, ND, NE, NH, NY, OH, PA, RI, SD, TN, VA, VT, WI, WV, and WY. On medium and fine soils, this type of application may be made as a split application, with ⅔ applied 30-45 days prior to planting and the remainder at planting, or as a single or split application at <30 days prior to planting. On coarse soils, this type of application should be made as a single application no earlier than 2 weeks prior to planting. Do not use on peat or muck soils.
Broadcast single or split preplant surface application to minimum- or no-till systems in spring Ground or aerial equipment		coarse - 2.0 medium - 2.5 fine - 3.0 6-20% OM - 3.8-4.0			
Broadcast preplant incorporated or pre-emergence application in spring Ground or aerial equipment		coarse - 2.0 medium - 2.5 fine (<3% OM) - 2.5 fine (≥3% OM) - 3.0 6-20% OM - 3.8-4.0			
Broadcast post-emergence until lay-by (corn 40 inches in height) Ground or aerial equipment	8 lb/gal EC [100-597] [100-673] 7.8 lb/gal EC [100-711]	3.0			

(continued; footnotes follow)

Table 2a. Continued.

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Corn (all types) *continued*					
Broadcast early preplant application Ground or aerial equipment	3.23 lb/gal EC [100-710]	coarse - 1.9 medium - 2.4 fine - 2.4-2.8	2 or (⅔ + ⅓) + 1	NS	The maximum seasonal rate is 3.0 lb ai/A. A 30-day PHI is specified for grazing or feeding of treated forage. The fall application should not be applied to frozen ground, and this use is restricted to IA, MN, ND, SD, WI and portions of NE and IL. The preplant surface application in spring is restricted to the following states: CO, CT, DE, IA, IL, IN, KS, KY, MA, MD, ME, MI, MN, MO, MT, ND, NE, NH, NY, OH, PA, RI, SD, TN, VA, VT, WI, WV, and WY. On medium and fine soils, this type of application may be made as a split application, with ⅔ applied 30-45 days prior to planting and the remainder at planting, or as a single or split application at <30 days prior to planting. On coarse soils, this type of application should be made as a single application no earlier than 2 weeks prior to planting. Do not use on peat or muck soils.
Broadcast preplant surface, preplant incorporated or pre-emergence application Ground or aerial equipment		coarse (<3% OM) - 1.2 coarse (≥3% OM) - 1.5-1.9 medium (<3% OM) - 1.5-1.9 medium (≥3% OM) - 1.9 fine (<3% OM) - 1.9 fine (≥3% OM) - 2.4-2.8	1		
Broadcast post-emergence or post-emergence-directed application Ground or aerial equipment		coarse - 1.2-1.5 medium - 1.9 fine - 2.4			

(continued; footnotes follow)

Table 2a. Continued.

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Cotton					
Preplant incorporated broadcast in NM, OK, and TX Ground equipment	8 lb/gal EC [100-597] [100-673]	sandy loam - 1.5 medium/fine- 2.0	2	NS	No PHI is specified. The maximum seasonal rate is 3.0 lb ai/A for coarse soils and 4.0 lb ai/A for medium and fine soils. Do not use in Gaines County, TX. Do apply to sand or loamy sand soils, or to a Taloka silt loam. Do not graze or feed forage or fodder from cotton to livestock.
Pre-emergence broadcast in AR, LA, MS, NM, OK, TN, TX, and in the bootheel of MO Ground or aerial equipment		sandy loam - 1.5 medium/fine- 2.0			
Post-emergence broadcast or directed application when plants are 3-12 inches in height Ground or aerial equipment		2.0			
Preplant incorporated broadcast in NM, OK, and TX Ground equipment	7.8 lb/gal EC [100-711]	sandy loam - 1.5 medium/fine- 2.0	1	NA	No PHI is specified. Do not use in Gaines County, TX. Do apply to sand or loamy sand soils, or to a Taloka silt loam. Do not graze or feed forage or fodder from cotton to livestock.
Pre-emergence broadcast in AR, LA, MS, NM, OK, TN, TX, and in the bootheel of MO Ground or aerial equipment		sandy loam - 1.5 medium/fine- 2.0			

(continued; footnotes follow)

Table 2a. Continued.

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Legume Vegetables (excluding soybeans)					
Broadcast application in fall to crop stubble after harvest Ground or aerial equipment	8 lb/gal EC [100-597] [100-673] 7.8 lb/gal EC [100-711]	medium/fine (>2.5% OM) - 3.0	2	NS	A 120-day PHI is specified for cutting hay. The maximum seasonal rate is 3.0 lb ai/A. Do not use on English peas in the northeastern U.S. The fall application should not be applied to frozen ground and is restricted to IA, MN, ND, SD, WI and portions of NE and IL.
Broadcast preplant incorporated or pre-emergence in spring Ground or aerial equipment		coarse - 2.0 medium - 2.5 fine (<3% OM)- 2.5 fine (≥3% OM)- 3.0			
Peanut					
Pre- or Post-plant incorporated (prior to crop germination) Ground equipment	8 lb/gal EC [100-597] [100-673] 7.8 lb/gal EC [100-711]	2.0	1 or 2-3	NS	All labels, except the 25% G, specify a 30-day PHI/PGI for forage and fodder and a 90-day PHI for mature peanuts. A maximum seasonal rate of 4 lb ai/A is specified on the two labels [100-597 and -673] allowing more than one application per season.
Pre-emergence broadcast Ground or aerial equipment		2.0 (NM, OK, TX) 3.0 (Southeast)			
Post-emergence directed at lay-by Ground or aerial equipment	8 lb/gal EC [100-597] [100-673]	2.0			

(continued; footnotes follow)

Table 2a. Continued.

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Potato					
Pre- or post-plant incorporated (prior to crop emergence) Ground equipment	8 lb/gal EC [100-597] [100-673] 7.8 lb/gal EC [100-711]	3.0	2	NS	A 60-day PHI is specified for applications made at-planting to drag-off and a 40-day PHI is specified for applications at lay-by. The maximum seasonal rate is 5.5 lb ai/A for formulations allowing multiple applications and 3.9-4.0 lb ai/A for the 7.8 lb/gal EC and 25% G formulation. Do not use on muck or peat soils or apply to sweet potatoes or yams. Do not use both as a pre-emergence and incorporated application. Do not use in Kern County, CA
Pre-emergence application Ground or aerial equipment		2.9-3.0 (<6% OM) 3.8-4.0 (6-20% OM)			
Post-emergence broadcast after hilling to lay-by Ground or aerial equipment	8 lb/gal EC [100-597] [100-673]	2.5			
Safflower					
Preplant incorporated or pre-emergence broadcast Ground or aerial equipment	8 lb/gal EC [100-597] [100-673] 7.8 lb/gal EC [100-711]	coarse - 2.0 medium - 2.5 fine (<3% OM)- 2.5 fine (≥3% OM)- 3.0	1	NA	No PHI is specified.

(continued; footnotes follow)

Table 2a. Continued.

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Sorghum (grain and forage types)					
Single or split preplant surface application to minimum- or no-till systems in CO, IA, IL, KS, MO, NE, and SD Ground or aerial equipment	8 lb/gal EC [100-597] [100-673] 7.8 lb/gal EC [100-711]	coarse - 2.0 medium - 2.25 fine - 2.5	1 or (⅔ + ⅓)	NA	Use only on sorghum that is seed treated with Concep or Screen. Do not make more than one application per year, with the exception of the split preplant surface applications. The preplant surface application may be made as a split application on fine and medium soils, with ⅔ applied 30-45 days prior to planting and the remainder at planting, or as a single or split application at <30 days prior to planting. On coarse soils, this type of application should be made as a single application no earlier than 2 weeks prior to planting. Early preplant applications should not be made to coarse soils nor to medium soils with <1% OM. Preplant surface, preplant incorporated or pre-emergence applications of the 3.23 lb/gal EC's should not be made in NM, the TX Panhandle, Gulf Coast, and Blacklands areas. The preplant incorporated application of the 3.23 lb/gal EC's should not be made in AZ or the Imperial Valley of CA.
Preplant incorporated or pre-emergence application Ground or aerial equipment					
Broadcast early preplant application to minimum- or no-till systems in IA, IL, KS, MO, NE, SD, and TX Ground or aerial equipment	3.23 lb/gal EC [100-710]	medium (>1% OM) - 2.2 fine (<1.5% OM) - 2.2 fine (>1.5% OM) - 2.4	1		
Preplant surface, preplant incorporated or pre-emergence application Ground or aerial equipment		medium/fine (>1% OM) - 1.9			

(continued; footnotes follow)

Table 2a. Continued.

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Single Application Rate [b] lb ai/A	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Soybean					
Broadcast application in fall to crop stubble after harvest Ground or aerial equipment	6 lb [1 [1 7.8 [1			NS	The maximum seasonal rate is 3.8-4.0 lb ai/A. There is no PHI specified for forage and hay and there is no restriction against the feeding of forage and hay to livestock. The fall application should not be applied to frozen ground and restricted to IA, MN, ND, SD, WI and portic and IL.
Broadcast preplant surface application to minimum- or no-till systems in spring Ground or aerial equipment					The springtime pr urface application is restricted to the f states: CO, CT, DE, IA, IL, IN, KS, K , M , MD, ME, MI, MN, MO, MT, ND, N NY, OH, PA, RI, SD, TN, VA, VT, W WV, and WY. On medium and fine soils, s type of application may be made as a spl pplication, with ⅔ applied 30-45 days prior planting and the remainder at planting, or single or split application at <30 days pr to planting. On coarse soils, this type of ap lication should be made as a single applicat n no earlier than 2 weeks prior to planting.
Broadcast preplant incorporated or pre-emergence application in spring Ground or aerial equipment					

(continued; footnotes follow)

Table 2a. Continued.

Site Application Type Application Timing Application Equipment	Formulation [a] [EPA Reg. No.]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Stone Fruits					
Broadcast application to soil Ground equipment	7.8 lb/gal EC [100-711]	3.8	1	NA	Applications should be made with a minimum of 10 gallons of water/A. Do not apply within 30 days of transplanting nonbearing trees into the orchard. Do not graze livestock in treated areas or feed livestock cover crops from treated areas.
Tree nuts					
Broadcast application to soil Ground equipment	7.8 lb/gal EC [100-711]	3.8	1	NA	Applications should be made with a minimum of 10 gallons of water/A. Do not apply within 30 days of transplanting nonbearing trees into the orchard. Do not graze livestock in treated areas or feed livestock cover crops from treated areas.

[a] Maximum use rates for most crops are based on soil textural class (coarse, medium, or fine) and the % organic matter (OM).

[b] Minimum application volumes of 5 and 2 gal/A are specified for ground and aerial applications, respectively, unless otherwise noted. The Re-entry interval (REI) is 24 hours for all formulations except EPA Reg. No. 100-711, which has a REI of 12 hours. The labels for metolachlor prohibit the rotation to crops except the following: (1) crops on the label can be replanted immediately provided a second metolachlor application is not made; (2) barley, oats, rye, or wheat may be planted 4½ months, alfalfa 4 months, tomatoes 6 months, and clover 9 months following treatment; (3) root crops, tobacco, buckwheat, milo, rice, cabbage or peppers may be planted the spring following treatment; (4) following lay-by or multiple treatments applied the previous season, tobacco, cabbage or peppers may be planted in spring. Additional rotational crop restrictions exist for the MAI formulation [EPA Reg. Nos. 100-710]; however, restrictions on this label are based on atrazine.

Table 2b. Food/Feed Use Patterns Subject To Tolerance Reassessment for *S*-Metolachlor (PC Code 108800).

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.][a]	Maxi... Single Appli... Rate[b]	Max. # Apps./season	Minimum RTI (Days)	Use Limitations[c]
Alfalfa (grown for seed)					
Broadcast application Ground equipment	[illegible]	[illegible]	1	NA	Applications should be made with a minimum of 20 gallons of water/A. Do not cut, feed, or graze treated forage, fodder, or hay of alfalfa, or use seeds from treated fields for sprouts. Do not use any portion of the treated field for human or animal consumption.
Cabbage (transplanted)					
Broadcast surface application Ground equipment	[illegible]	[illegible]	1	NA	Application should be made within 48 hours of transplanting and in a minimum of 10-20 gallons of water/A.

(*continued; footnotes follow*)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.] [a]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Cabbage (direct-seeded)					
Broadcast application Ground equipment	7.6 lb/gal EC [TX990009] [NJ990004] [NY990001] [FL990006]	1.3	1	NA	Application should be made at the four-leaf stage and in a minimum of 10 gallons of water/A.
Broadcast pre-emergence or post-emergence application Ground equipment	7.6 lb/gal EC [FL990006]	sandy soils - 1.3 organic soils -3.8			Pre-emergence applications should be made immediately after seeding. Post-emergence applications should be made at least 20 days after seeding. Applications should be made with a minimum of 20 gallons of water/A.
Celery					
Broadcast application prior to or immediately after transplanting Ground equipment	7.6 lb/gal EC [WI990008] [FL990008]	coarse - 1.3 medium/fine - 1.6 OM >3% - 1.9	1	NA	Application of [FL990008] should not be made within 62 days of harvest.

(continued; footnotes follow)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.] [a]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Corn (all types)					
Broadcast application in fall to crop stubble after harvest Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-965] 7.6 lb/gal RTU [d] [100-829] 16% G [100-910]	medium/fine (>2.5% OM) - 1.9 6-20% OM - 2.4-2.5	2 or (⅔ + ⅓) + 1	NS	The maximum seasonal rate is 3.7 lb ai/A on all labels except the 16% G and 7.6 lb/gal RTU (2.4 lb ai/A/season) and the 2.4 lb/gal FlC (2 lb ai/A/season). A 30-day PHI is specified for grazing or feeding of treated forage. The fall application should not be applied to frozen ground, and this use is restricted to IA, MN, ND, SD, WI and portions of NE and IL. The preplant surface application in spring is restricted to the following states: CO, CT, DE, IA, IL, IN, KS, KY, MA, MD, ME, MI, MN, MO, MT, ND, NE, NH, NY, OH, PA, RI, SD, TN, VA, VT, WI, WV, and WY. On medium and fine soils, this type of application may be made as a split application, with ⅔ applied 30-45 days prior to planting and the remainder at planting, or as a single or split application at <30 days prior to planting. On coarse soils, this type of application should be made as a single application no earlier than 2 weeks prior to planting. Do not use on peat or muck soils.
Broadcast single or split preplant surface application to minimum- or no-till systems in spring Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-965] 7.6 lb/gal RTU [d] [100-829] 2.4 lb/gal FlC [100-817] 2.4 lb/gal EC [100-886] 16% G [100-910]	coarse - 1.3 medium - 1.6 fine - 1.6-1.9 6-20% OM - 2.4-2.5			
Broadcast preplant incorporated or pre-emergence application in spring Ground or aerial equipment		coarse - 1.3 medium - 1.6 fine (<3% OM) - 1.6 fine (≥3% OM) - 1.6-1.9 6-20% OM - 2.4-2.5			
Broadcast post-emergence until lay-by Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-965] 2.4 lb/gal FlC [100-817]	1.6-1.9			

(*continued; footnotes follow*)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.] [a]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Corn (all types, continued)					
Broadcast early preplant application Ground or aerial equipment	3.33 lb/gal EC [100-827]	coarse - 1.3 medium - 1.6 fine - 1.8	1 or (⅔ + ⅓)	NA	The maximum seasonal rate is 3.7 lb ai/A. A 30-day PHI is specified for grazing or feeding of treated forage. The early preplant surface application may be applied as a split application (⅔ + ⅓) on medium and fine soil. On coarse soils, this type of application should be made as a single application no earlier than 2 weeks prior to planting. Do not use on peat or muck soils.
Broadcast preplant surface, preplant incorporated or pre-emergence application Ground or aerial equipment		coarse (<3% OM) - 0.8 coarse (≥3% OM) - 1.3 medium - 1.3 fine (<3% OM) - 1.3 fine (≥3% OM) - 1.8			
Broadcast post-emergence or post-emergence-directed application Ground or aerial equipment		coarse - 0.8-0.9 medium - 1.3 fine - 1.6			
Corn, field					
Broadcast single early preplant application Ground equipment	2.5 lb/gal EC [100-928]	coarse - 1.3 medium - 1.3 fine - 1.4	1	NA	The maximum seasonal rate is 1.4 lb ai/A. An 85-day PHI/PGI is specified. Early preplant applications should be made no earlier than two weeks before planting. Do not use on peat or muck soils. Do not apply to pop or sweet corn.
Broadcast preplant surface, preplant incorporated or pre-emergence application Ground equipment		coarse (<3% OM) - 1.0 coarse (≥3% OM) - 1.3 medium - 1.3 fine (<3% OM) - 1.3 fine (≥3% OM) - 1.4			

(continued; footnotes follow)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.] [a]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Cotton					
Preplant incorporated broadcast in NM, OK, and TX Ground equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-965]	sandy loam - 1.0 medium/fine- 1.3	2	NS	No PHI is specified. The maximum seasonal rate is 1.9 lb ai/A for coarse soils and 2.5 lb ai/A for medium and fine soils. Do not use in Gaines County, TX. Do apply to sand or loamy sand soils, or to a Taloka silt loam. Do not graze or feed forage or fodder from cotton to livestock.
Pre-emergence broadcast in AR, LA, MS, NM, OK, TN, TX, and in the bootheel of MO Ground or aerial equipment					
Post-emergence broadcast or directed application when plants are 3-12 inches in height Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-964]	1.3			
Post-emergence broadcast or directed application when plants are up to 6 inches in height Ground or aerial equipment	7.6 lb/gal EC [TX990008]	sandy loam - 1.0 medium/fine- 1.3	1	NA	Use only in Yoakum, Terry, Gaines, and Andrews Counties of TX. Do apply to sand or loamy sand soils.
Legume Vegetables (excluding soybeans)					
Broadcast application in fall to crop stubble after harvest Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-965]	medium/fine (>2.5% OM) - 1.9	2	NS	A 120-day PHI is specified for cutting hay. The maximum seasonal rate is 1.9 lb ai/A. Do not use on English peas in the northeastern U.S. The fall application should not be applied to frozen ground and is restricted to IA, MN, ND, SD, WI and portions of NE and IL.
Broadcast preplant incorporated or pre-emergence in spring Ground or aerial equipment		coarse - 1.3 medium - 1.6 fine (<3% OM)-1.6 fine (≥3% OM) 1.9			

(continued; footnotes follow)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.][a]	[illegible] Single [illegible] Rate[b] ([illegible]A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations[c]
Meadowfoam (grown for seed)					
Broadcast application Ground equipment	7.6 lb/gal EC [OR990[illegible]		1	NA	Applications should be made with a minimum of 20 gallons of water/A. Do not feed or graze forage or fodder, cut meadowfoam for hay or forage, or use seeds from treated fields for sprouts. Do not use any portion of the treated field for human or animal consumption. Do not apply through irrigation systems.
Onion (dry bulb)					
Broadcast application Ground equipment	[illegible] lb/[illegible] [illegible] [illegible] [illegible] [illegible]0001] [illegible]02] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [TX[illegible] [VA[illegible]		[illegible]	NA	One application should be made at the two true leaf stage. A second application may be made 3-4 weeks later as needed in some states (CO, ID, NM, OR, UT, and [illegible]) or when soils contain >5% OM in the other [illegible] (MN, NJ, NY, TX, VA, and WI) The maximu[illegible] as[illegible]nal rate is 2.6 lb ai/A. A 60-day Pl[illegible] sp[illegible]fied. Do not feed [illegible]ra[illegible]nimals on green forage or stubble, or h[illegible]s [illegible]en onions. Do not apply [illegible]ou[illegible] irrigation systems.
Peach					
Broadcast application to soil Ground equipment	7.6 lb/gal EC [NJ990011]	[illegible]	1	NA	Applications sh[illegible]d be made with a minimum of 10 gallons of wa[illegible]er [illegible]. Do not appl[illegible] w[illegible]hin 30 days of transplanting nonbearing [illegible]rees into the orchard. Do not gra[illegible] livestock in treated areas or feed livestock c[illegible]ver crops from treated areas.

(*continued; footnotes follow*)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.] [a]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Peanut					
Pre- or Post-plant incorporated (prior to crop germination) Ground equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-965] 16% G [100-910]	1.3	1 or 2	NS	The labels specify a 30-day PHI/PGI for forage and fodder and a 90-day PHI for mature peanuts. For the 16% G, only one application per season is permitted, with a maximum seasonal rate of 1.9 lb ai/A. For all other formulations, two applications are allowed and the maximum seasonal rate is 2.7 lb ai/A.
Pre-emergence broadcast Ground or aerial equipment		1.3 (NM, OK, TX) 1.9 (Southeast)			
Post-emergence directed at lay-by Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-964]	1.3			
Peppers, bell (transplanted)					
Broadcast application Ground equipment	7.6 lb/gal EC [DE990001] [MA990002] [NJ990004] [NY990001] [OH990001] [PA990003]	1.0	1	NA	Application should be made within 48 hours of transplanting. Applications should be made with a minimum of 10-20 gallons of water/A. A 60- or 65-day PHI is specified.
	7.6 lb/gal EC [KY990001]	1.3			
Directed, shielded application to plastic-mulched row middles Ground equipment	7.6 lb/gal EC [FL990007]	1.0			

(continued; footnotes follow)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.] [a]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Peppers, bell or non-bell					
Broadcast application Ground equipment	7.6 lb/gal EC [TX990009]	1.0	1	NA	Application should be made within 48 hours of transplanting or by the 8-leaf stage to directed-seeded plants. A 60-day PHI is specified.
Peppers, chile					
Post-emergence basally-directed application Ground equipment	7.6 lb/gal EC [NM990002]	1.3	1	NA	Application should be made when peppers have 4-6 leaves. Applications should be made with a minimum of 20 gallons of water/A. A 65-day PHI is specified. Do not apply through irrigation systems.
Peppers, tabasco					
Post-emergence basally-directed application Ground equipment	7.6 lb/gal EC [LA990013]	2.5	1	NA	Application may be made at lay-by (midseason) using a minimum of 10 gallons of water/A. A 7-day PHI is specified. Do not apply through irrigation systems.
Potato					
Pre- or post-plant incorporated (prior to crop emergence) Ground equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-965] 16% G [100-910]	1.9	1 or 2	NS	A 60-day PHI is specified for applications made at-planting to drag-off and a 40-day PHI is specified for applications at lay-by. The maximum seasonal rate is 3.4 lb ai/A for multiple applications or 2.4 lb ai/A for single applications. Do not use on muck or peat soils or apply to sweet potatoes or yams. Do not use both as a pre-emergence and incorporated application. Do not use in Kern County, CA
Pre-emergence application Ground or aerial equipment		<6% OM - 1.9 6-20% OM -2.4-2.5			
Post-emergence broadcast after hilling to lay-by Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-964]	1.6			

(*continued; footnotes follow*)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.] [a]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use [illegible]ns [c]
Radish (grown for seed)					
Broadcast preplant incorporated application Ground equipment	7.6 lb/gal EC [WA990005] [OR990011]		1	NA	Applications should b[illegible] a[illegible]ith a minimum of 20 gallons of water/A. Do not feed, cut, or g[illegible]sh tops for livestock feed, or use any port[illegible] treated crop for human or animal co[illegible]n. Do not apply throug[illegible]tion systems.
Safflower					
Broadcast preplant incorporated or pre-emergence in spring Ground or aerial equipment	7.6 lb/g[illegible] [100-8[illegible] [100-81[illegible] [100-96[illegible] [100-96[illegible]	[illegible]se .3 [illegible]ed 1.[illegible] [illegible](< 4 [illegible](≥ 4)	1	NA	No PHI is specified.

(continued; footnotes follow)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.] [a]	Maximum Single Application Rate [b] (lb ai/A)	Max. # Apps./season	Minimum RTI (Days)	Use Limitations [c]
Sorghum (grain and forage types)					
Single or split preplant surface application Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-965] 2.4 lb/gal FlC [100-817] 2.4 lb/gal EC [100-886]	coarse - 1.3 medium - 1.43 fine - 1.6	1 or (⅔ + ⅓)	NA	Use only on sorghum that is seed treated with Concep or Screen. On medium and fine soils, the preplant surface application may be made as a split application, with ⅔ applied 30-45 days prior to planting and the remainder at planting, or as a single or split application at <30 days prior to planting. On coarse soils, this type of application should be made as a single application no earlier than 2 weeks prior to planting. Do not make more than one application per year, with the exception of the split applications.
Preplant incorporated or pre-emergence application Ground or aerial equipment					
Broadcast preplant surface application Ground or aerial equipment	3.33 lb/gal EC [100-827]	medium (>1% OM)- 1.42 fine (<1.5% OM) - 1.42 fine (>1.5% OM) - 1.58			Preplant surface, preplant incorporated or pre-emergence applications of the 3.33 lb/gal EC should not be made in NM, the TX Panhandle, Gulf Coast, and Blacklands areas. The preplant incorporated application of the 3.33 lb/gal EC should not be made in AZ or the Imperial Valley of CA.
Preplant surface, preplant incorporated or pre-emergence application Ground or aerial equipment		medium/fine (>1% OM) - 1.25	1		

(continued; footnotes follow)

Table 2b. Continued.

Site Application Type Application Timing Application Equipment	Formulation [EPA Reg. No.] or [SLN No.][a]				Max. # seasons	Minimum RTI (Days)	Use [illegible]tations[c]
Soybean							
Broadcast application in fall to crop stubble after harvest Ground or aerial equipment	7.6 lb/gal EC [100-816] [100-818] [100-964] [100-[illegible]5]	[illegible]	[illegible]	4		NS	The [illegible]mum seas[illegible]ate is 2.4-2.5 lb ai/A. The [illegible] PHI [illegible]pe[illegible] for forage and hay or a restri[illegible]ain[illegible]th [illegible]ding of forage and hay to livesto[illegible] The fall [illegible]ld not be applied to frozen ground a[illegible] is [illegible]stricted to IA, MN, ND, SD, WI and portions of [illegible] and IL. The preplant su[illegible]c[illegible]plication in spring is restricted to the [illegible]ll [illegible]ing states: CO, CT, DE, IA, IL, IN, KS, KY, [illegible]L, MD, ME, MI, MN, MO, MT, ND, NE, NH, N[illegible], [illegible], PA, RI, SD, TN, VA, VT, WI, WV, and W[illegible]. [illegible]his type of application may be may as a split ([illegible]+[illegible]a) application on medium or fine soils.
Broadcast preplant surface application to minimum- or no-till systems in spring Ground or aerial equipment	[illegible]	[illegible]	[illegible]	[illegible]			
Broadcast preplant incorporated or pre-emergence application in spring Ground or aerial equipment	[illegible]	[illegible]	[illegible]	[illegible]			
Broadcast preplant incorporated or pre-emergence application to conventional till systems in spring Ground or aerial equipment	6.3 [illegible] EC [100-9[illegible]]	[illegible]	[illegible]	[illegible]	1	NA	The maximum seas[illegible]al rate is 2.6 lb ai/A. A 40-day PHI/PGI[illegible] specified for grazing or feeding of treate[illegible]s [illegible]ybean plants. Use in CA and [illegible]nd soils is prohibited. All preplant a[illegible]ic[illegible]ions should be made 0-14 days before planti[illegible]x[illegible]pt the sequential preplant application, w[illegible]h [illegible]hould be made 15-30 days before planting The preplant and p[illegible]-emergence applications in coarse soils can be [illegible]plied at a maximum of 1.4 lb ai/A in the followir[illegible]states: AL, AR, FL, GA, LA, MO, MS, NC, O[illegible]. [illegible], TN, TX, and VA.
Broadcast preplant surface application to minimum- or no-till systems in spring Ground or aerial equipment	[illegible]	[illegible]	[illegible]	[illegible]			
Broadcast sequential preplant and pre-emergence application to minimum- or no-till systems in spring Ground or aerial equipment	[illegible]	[illegible]	[illegible]	[illegible]	2	NS	

[a] All Special Local Need labels (SLN Nos.) are based on t[illegible].6 [illegible]A [illegible]anual [EPA Reg. No. 100-816].

Table 2b. Continued.

[b] Maximum use rates for most crops are based on soil textural class (coarse, medium, or fine) and the % organic matter (OM).

[c] Minimum application volumes of 5 and 2 gal/A are specified for ground and aerial applications, respectively. The REI is 24 hours for all formulations except EPA Reg. No. 100-958, which has a REI of 12 hours. The labels for *S*-metolachlor list the following planting restrictions for rotational crops: (1) crops on the label can be replanted immediately provided a second *S*-metolachlor application is not made; (2) barley, oats, rye, or wheat may be planted 4½ months, alfalfa 4 months, tomatoes 6 months, and clover 9 months following treatment; (3) root crops, tobacco, buckwheat, milo, rice, cabbage or peppers may be planted the spring following treatment; (4) following lay-by or multiple treatments applied the previous season, tobacco, cabbage or peppers may be planted in spring. Additional rotational crop restrictions exist for MAI formulations [EPA Reg. Nos. 100-817, -827, -886, -928, and -958]; however, restrictions on these labels are based on the other active ingredients, such as atrazine.

[d] The 7.6 lb/gal RTU [EPA Reg No. 100-829], for use in corn and soybeans, should be mixed with a minimum of 200 lb/A of dry fertilizer and applied using only ground equipment. Do not mix with water or liquid fertilizer.

C. SUMMARY OF RESIDUE CHEMISTRY DATA REQUIREMENTS

Table 3. Summary of Residue Chemistry Data Requirements for Metolachlor and *S*-Metolachlor (PC Codes 108801 and 108800).

Guideline No.	Guideline Description / Commodity	§180.368 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.[1]	Comments
860.1200	Directions for Use	NA	Yes		Recommendations for label changes are listed under the Use Pattern Table Section.
860.1300	Nature of the Residue - Plants	NA	No	00015423, 00015424, 00015652, 00015653, 00022872, 00022873, 00022874, 00022879, 00022880, 00074898, 00074900, **40766601, 42644301, 42652101**	Adequate studies are available for both metolachlor and *S*-metolachlor on corn, potatoes, and soybeans. Metabolism data for metolachlor is adequate for *S*-metolachlor.
860.1300	Nature of the Residue - Animals	NA	No	00015413, 00015425, 00015695, 00015696, 00015697, 00022885, 00022886, 00022887, 00039181, 00039192, 00039193	Ruminant and poultry metabolism studies for metolachlor are adequate and will cover the use of *S*-metolachlor.
860.1340	Residue Analytical Methods	NA	No	00015432, 00015466, 00015543, 00015698, 00016306, 00039176, 00111693, 00125227, 43928939[2], 43661201[3]	Adequate methods are available for enforcing tolerances of metolachlor and *S*-metolachlor on plant and animal commodities.
860.1360	Multi-Residue Method	NA	No		Metolachlor and *S*-metolachlor are completely recovered.
860.1380	Storage Stability Data	NA	No	00015469, **40980702, 40980703, 41425502, 41506401, 42384401, 42502901, 42810601,** 43881703[4], 43944601[4]	Crop field trials, processing studies, and feeding studies are supported by adequate metolachlor storage stability data.
860.1400	Magnitude of the Residue - Water, Fish, and Irrigated Crops	NA	NA		

(continued; footnotes follow)

Table 3. Continued.

Guideline No.	Guideline Description / Commodity	§180.368 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.[1]	Comments
860.1460	Magnitude of the Residue - Food Handling	NA	NA		
860.1480	Magnitude of the Residue - Meat, Milk, Poultry, Eggs		No	00015413, 00022885, 00022887, 00106041	The available metolachlor ruminant and poultry feeding studies are adequate and will cover the use of *S*-metolachlor.
	Milk	0.02			
	Fat, meat, and meat byproducts (excluding liver and kidney) of cattle, goat, hog, horse, and sheep	0.02			
	Kidneys of cattle, goat, hog, horse, and sheep	0.2			
	Liver of cattle, goats, hogs, horses, and sheep	0.05			
	Egg	0.02			
	Poultry, fat, meat, and meat byproducts (excluding liver)	0.02			
	Poultry, liver	0.05			
860.1500	Crop Field Trials				
	Root and Tuber Vegetables Group				
	Potato	0.2	No	00105957, 00106191, 00109613	Adequate metolachlor data are available, and will cover the use of *S*-metolachlor.
	Radish (grown for seed)	none	No	none	This use is considered a non-food/feed use.
	Bulb Vegetables Group				
	Onion, dry bulb	1.0	Yes[5]	43000101[6]	There are currently no metolachlor labels (Syngenta) for use on onions, but there are a total of 13 SLNs for use of *S*-metolachlor on dry bulb onions. **Residue data are required supporting the current use of *S*-metolachlor (EC) on dry bulb onions and the registrant should seek a *S*-metolachlor section 3 registration on onion.**

(continued; footnotes follow)

Table 3. Continued.

Guideline No.	Guideline Description / Commodity	§180.368 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.[1]	Comments
180.1500	Leafy Vegetables (Except *Brassica*) Group				
	Celery	0.1	No	**41551201**	Adequate metolachlor data are available, and will cover the use of *S*-metolachlor.
	Spinach	0.3[7]	No	44615401[8]	Pending PP#8E5011, adequate metolachlor data are available, and will cover the use of *S*-metolachlor provided that the proposed label directions for metolachlor (EC) on spinach are amended to specify a maximum seasonal rate of 1.0 lb ai/A and a PHI of 40 days.
	Brassica Leafy Vegetables Group				
	Cabbage	1.0	Yes[5]	**40644901**	There are currently no metolachlor labels (Syngenta) for use on cabbage, but there are a total of 10 SLN labels for use of *S*-metolachlor on cabbage. **Data are required supporting the current use of *S*-metolachlor (EC) on cabbage. The registrant should seek a *S*-metolachlor section 3 registration on cabbage.**
	Legume Vegetables Group				
	Seed and pod vegetables (except soybean)	0.3	Yes[9]	00128731, 43295701[10]	Adequate metolachlor residue data are available on edible-podded and shelled dried peas and beans and will cover the use of *S*-metolachlor; however, **data are required on representative succulent shelled peas and beans.**
	Soybean	0.2	Yes[11]	00015399-00015411, 00015540-00015541, 00015706, 00015719, 00015721-00015723, 00015725-00015729, 00015735-00015737, 00015760-00015774, 00015777-00015780, 00016248, 00016427, 00016604, 00039174, 43178402[12], 43928941[2], 44516802[13]	Adequate metolachlor and *S*-metolachlor residue data are available; however, **data on aspirated grain fractions are required.**

Table 3. Continued.

Guideline No.	Guideline Description / Commodity	§180.368 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.[1]	Comments
180.1500	Foliage of Legume Vegetables Group Legume vegetable group foliage (except soybean forage and hay)	15.0	No	00128731, 43295701[10]	Adequate metolachlor residue data are available on forage (vines) and hay, and will cover the use of *S*-metolachlor.
	Soybean forage and hay	8.0	No	00015399-00015403, 00015408, 00015540-00015542, 00015706, 00015719, 00015721, 00015722, 00015725-00015729, 00015731-00015737, 00015760-00015775, 00015777, 00039174, 43178402[11], 4392894[12]	Adequate metolachlor residue data are available provided labels are amended to prohibit grazing or harvest of soybean forage and hay following the post-emergence use.
860.1500	Fruiting Vegetables (except Cucurbits) Group Tomato	0.1[7]	No	44056101[14]	Adequate metolachlor data are available, and will cover the use of *S*-metolachlor.
	Pepper, bell	0.1	Yes[15]	**40557301**	Adequate metolachlor residue data are available to support the current regional registrations on tabasco, cubanelle, and chili peppers; however, **three additional field trials on bell peppers are required to support a general tolerance on peppers at 0.5 ppm.**
	Pepper, chili	0.5		00150180	
	Pepper, Cubanelle	0.1		**40899301**	
	Pepper, Tabasco	0.5		**00156573**	
	Fruit, Stone, group	0.1	No	**00131376**	Adequate metolachlor data are available.
	Nuts, Tree, group Almond, hulls	0.1 0.3	No	00131377[16]	**Use directions must be amended. Data support only a single application per season.**

(continued; footnotes follow)

Table 3. Continued.

Guideline No.	Guideline Description / Commodity	§180.368 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.[1]	Comments
860.1500	Cereal Grains Group				
	Corn, grain	0.1	Yes[17]	00015428-00015430, 00015570-00015572, 00015586-00015602, 00015676-00015694, 00015704, 00015705, 00015707-00015718, 00015739-00015757, 00015786, 00015787, 00015950, 00015954, 00015955, 00016392-00016399, 00016435-00016437, 43178401[11], 43725502[18], 43928940[2], 43928942[2]	Adequate metolachlor residue data are available for both corn, grain and K+CWHR reflecting combined pre- and post-emergence applications at the maximum use rate (6 lb ai/A/season). These data will also cover use of *S*-metolachlor; however, **data on aspirated grain fractions are required.**
	Corn, fresh (including sweet, K+CWHR)	0.1	No		
	Sorghum, grain	0.1	Yes[19]	00015548-00015552, 00016607-00016610, 00016990-00016992, 00111693	**Data on aspirated grain fractions are required.**
	Forage, Fodder, Straw of Cereal Grains Group				
	Corn, fodder and forage	8.0	No	As above for corn grain	Adequate metolachlor residue data are available for corn forage and fodder (stover) reflecting combined pre- and post-emergence applications at the maximum use rate (6 lb ai/A/season). These data will also cover use of *S*-metolachlor.
	Sorghum, fodder and forage	2.0	No	00015548-00015552, 00016607-00016610, 00016990-00016992, 00111693	Adequate metolachlor data are available, and will cover the use of *S*-metolachlor.

(continued; footnotes follow)

Table 3. Continued.

Guideline No.	Guideline Description / Commodity	§180.368 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.[1]	Comments
860.1500	Grass Forage, Fodder, and Hay Group				
	Grass, forage	10.0[7]	No	42885701[20], 44470101[21]	Adequate metolachlor data are available to support the establishment of permanent tolerances with a regional registration for metolachlor residues in/on grass forage.
	Grass, hay	0.2[7]			
	Miscellaneous Commodities				
	Cottonseed	0.1	No	00065048, 00129058, **40980707**, 43178403[11], 43661201[3], 44667401[22]	Metolachlor residue data on cottonseed are adequate, and will cover use of *S*-metolachlor. These data will also cover use of *S*-metolachlor.
	Cotton gin byproducts	None	No	44667401[23]	Adequate metolachlor data are available. These data will also cover use of *S*-metolachlor.
	Peanut	0.5	No	00015553-00015557, 43263101[24], 43725501[16], 43881701[4], 44755401[25]	Adequate metolachlor data are available to support residues in/on peanut nutmeats and peanut hay. These data will also cover use of *S*-metolachlor. **The tolerances for peanut forage should be revoked.**
	Peanut, forage and hay	30.0		43263101[21], 43881701[4]	
	Safflower seed	0.1	No	43881702[4]	Adequate metolachlor data are available, and will cover the use of *S*-metolachlor.
860.1520	Processed Food/Feed				
	Corn	No	No	**40980705**	Residues of metolachlor do not concentrate in corn or cottonseed processed commodities. These data will also cover use of *S*-metolachlor.
	Cottonseed	No	No	**40980707**, 43661201[3]	
	Peanut	No	No	**40980708**	Metolachlor data indicate that **residues concentrate in peanut meal.** These data will also cover use of *S*-metolachlor.
	Potato	None	No	[illegible]**80704**	Metolachlor data indicate that **residues slightly concentrate in potato wet peel.** These data will also cover use of *S*-metolachlor.

(continued: footnotes follow)

Table 3. Continued.

Guideline No.	Guideline Description / Commodity	§180.368 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.[1]	Comments
860.1520	Processed Food/Feed cont.				
	Safflower	None	No	43881702[4]	Metolachlor residues do not concentrate in safflower oil. These data will also cover use of *S*-metolachlor.
	Soybean	None	No	**40980706, 41506501**	Data indicate that metolachlor residues concentrate in soybean hulls and a separate tolerance for soybean hulls is required for metolachlor. *S*-metolachlor data indicates that the current tolerance on soybeans is adequate for residues of *S*-metolachlor in soybean hulls.
	Tomato	puree - 0.3[7] paste - 0.6[7]	No	41164401[26], 44056101[27]	Data indicate thatmetolachlor residues concentrate in tomato puree and paste. These data will also cover use of *S*-metolachlor.
860.1650	Submittal of Analytical Reference Standards	NA	Yes	NA	**Analytical grade reference standards are required as requested by the repository for metolachlor, *S*-metolachlor, and all metabolites of concern.**
860.1850	Confined Accumulation in Rotational Crops	NA	Yes[28]	41470601[29]	The confined rotational crop study is inadequate for metolachlor and *S*-metolachlor use, but potentially upgradeable. **Data to upgrade this study are required.**
860.1900	Field Accumulation in Rotational Crops				
	Tomato	None	No	41164401[23]	A tolerance is not required for metolachlor or *S*-metolachlor.
	Nongrass Animal Feeds (Forage, Fodder, Straw and Hay) Group	3.0	No	43367101[30]	Adequate metolachlor data are available, and will cover the use of *S*-metolachlor.

(continued; footnotes follow)

Table 3. Continued.

Guideline No.	Guideline Description / Commodity	§180.368 Tolerances (ppm)	Must Additional Data Be Submitted?	MRID Nos.[1]	Comments
860.1900	Field Accumulation in Rotational Crops cont.				
	Barley, grain	0.1			
	Buckwheat, grain	0.1			
	Millet, grain	0.1			
	Milo, grain	0.1			
	Oats, grain	0.1			
	Rice, grain	0.1			
	Rye, grain	0.1			
	Wheat, grain	0.1	Yes[31]	00078297	The available metolachlor residue data for rotated cereal grains are not adequate and reflect plant-back intervals of 6-18 months; however, labels for metolachlor and *S*-metolachlor currently specify a plant-back interval of 4.5 months for barley, oats, rye and wheat. **Residue data are required for both metolachlor and *S*-metolachlor on grain, forage, hay, and straw of representative cereal grains (wheat and oats) supporting the 4.5 month plant-back interval.**
	Barley, fodder	0.5			
	Millet, fodder and forage	0.5			
	Milo, fodder and forage	0.5			
	Oats, fodder and forage	0.5			
	Rice, fodder and forage	0.5			
	Rye, fodder and forage	0.5			
	Wheat, fodder and forage	0.5			

1. Unless otherwise indicated, references cited in the Residue Chemistry Chapter of the Metolachlor FRSTR (9/4/86) are listed in normal type (citation for data generated by Craven Laboratories are not included) and references cited in the most recent Addendum to the Residue Chemistry Chapter of the Metolachlor RED (10/4/94) are listed in **bold**; other references were reviewed as cited.

2. DP Barcode D226780, L. Kutney, 11/12/96.

3. DP Barcode D216069, W. Cutchin, 7/10/96.

4. DP Barcodes D222430 and D224237, S. Hummel, 2/25/97.

5. SLN uses for metolachlor on cabbage and dry bulb onions have been completely replaced by use of *S*-metolachlor. The current tolerance for both cabbage and onions (1.0 ppm) is well above the method LOQ (0.08 ppm). Residue data are required on cabbage and onions depicting the use of *S*-metolachlor at the maximum labeled rate.

(continued; footnotes follow)

Table 3. Continued.

6. PP#4E4286, DP Barcode D197404, M. Bradley, 7/28/94.

7. Time limited tolerances [180.368(b)] for grass forage (10.0 ppm) and hay (0.2 ppm) and spinach (0.3 ppm) are set to expire on 12/31/01, and the temporary tolerances on tomatoes (0.1 ppm) and tomato paste (0.6 ppm) and puree (0.3 ppm) are set to expire on 6/30/02.

8. DP Barcode D280216, S. Kinard, 2/28/02.

9. Adequate residue data are available to support uses on edible-podded and dried shelled legume vegetables (excluding soybean), Crop subgroups 6-A and 6-C); however, metolachlor residue data are required on representative shelled, succulent peas and beans (Crop subgroup 6-B) to support the current use on legume vegetables.

10. DP Barcode D206103, D. Miller, 9/13/94.

11. Residue data on aspirated grain fractions are required for any post-harvest use on corn, sorghum, soybean, or wheat.

12. DP Barcode D201438, S. Hummel, 6/23/94.

13. DP Barcode D280215, S. Kinard, 2/28/02.

14. DP Barcode D280219, S. Kinard, 2/28/02.

15. Three additional field trials on bell peppers are required to support a general tolerance on peppers at 0.5 ppm (DP Barcode D223350, M. Rodríguez, 3/6/96).

16. These data were reviewed under PP#3F2958 by K. Arne in memos dated 1/9/84, 2/14/84 and 1/8/85.

17. Residue data on aspirated grain fractions are required for any post-harvest use on corn, sorghum, soybean, or wheat.

18. DP Barcode D218548, under review.

19. Residue data on aspirated grain fractions are required for any post-harvest use on corn, sorghum, soybean, or wheat.

20. PP#3F04251, DP Barcode D194844, G. Kramer, 9/2/94; PP#6E04638, DP Barcode D221778, G. Kramer, 2/9/96; and PP#6E04638, DP Barcode D224977, G. Kramer, 4/17/96.

21. DP Barcode D280214, S. Kinard, 2/28/02.

22. DP Barcode D280217, S. Kinard, 2/28/02.

(continued; footnotes follow)

Table 3. Continued.

23. DP Barcode D280217, S. Kinard, 2/28/02.

24. DP Barcode D204467, S. Hummel, 9/29/94.

25. DP Barcode D280218, S. Kinard, 2/28/02.

26. PP#0E3854, CB Nos. 5764-5767, F. Toghrol, 12/28/89; and CB Nos. 9109 and 9119, M Bardley, 4/13/92.

27. DP Barcode D280219, S. Kinard, 2/28/02.

28. The confined rotational crop study is inadequate, but potentially upgradeable. Additional data are required characterizing the ^{14}C-residues in plants, along with information on the percentage of the residue measured by the current enforcement method, supporting storage stability data, and sample storage conditions and intervals. The suggested plant-back intervals are tentative until adequate data are available.

29. DP Barcode D207842, S. Hummel, 10/12/94.

30. DP Barcode D207519, S. Hummel, 9/29/95.

31. Data are required depicting residues in/on representative rotated cereal grains planted 4.5 months following a single application of metolachlor at the maximum rate for corn. Field trials should be conducted using wheat and oats, and samples of forage, hay, straw and grain should be collected from each test.

(continued; footnotes follow)

D. RESIDUE CHARACTERIZATION

1. General Discussion on Residue Chemistry of Metolachlor and *S*-Metolachlor

a. Nature of the Residue in Plants

The qualitative nature of metolachlor residues in plants is adequately understood based upon the adequate corn, potato, and soybean metabolism studies. The metabolism of metolachlor involves conjugation with glutathione, breakage of this bond to form the mercaptan, conjugation of the mercaptan with glucuronic acid, hydrolysis of the methyl ether, and conjugation of the resultant alcohol with a neutral sugar. A minor pathway may involve sugar conjugation of metolachlor directly to the corresponding oxo-compounds. Residues of concern in plants include metolachlor and its metabolites, determined as the derivatives CGA-37913 and CGA-49751 (Figure 1). The residues of concern for *S*-metolachlor are the same as for metolachlor (DP Barcode D226780, L. Kutney, 11/12/96); however, the Agency is currently currently reviewing additional submitted data (DP Barcodes D278742 and D279110, MRID Nos. 45499603-49499605, 45499607-45499610). These data will be incorporated into future assessments for metolachlor and *S*-metolachlor.

b. Nature of the Residue in Livestock

Adequate studies are available depicting the metabolism of metolachlor in ruminants and poultry. Metolachlor is rapidly metabolized and almost totally eliminated in the urine and feces of ruminants (goats), non-ruminants (rats), and poultry. Metolachlor *per se* was not detected in any of the excreta or tissues. As in plants, metolachlor residues of concern in livestock commodities includes metolachlor and its metabolites, determined as the derivatives CGA-37913 and CGA-49751. The residues of concern for *S*-metolachlor in animals are the same as for metolachlor; however, the Agency is currently currently reviewing additional submitted data (DP Barcode D226780, L. Kutney, 11/12/96); however, the Agency is currently currently reviewing additional submitted data (DP Barcodes D278742 and D279110, MRID Nos. 45499603-49499605, 45499607-45499610). These data will be incorporated into future assessments for metolachlor and *S*-metolachlor.

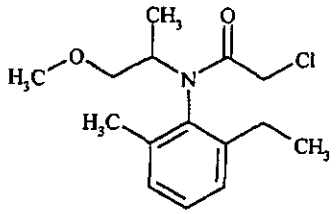
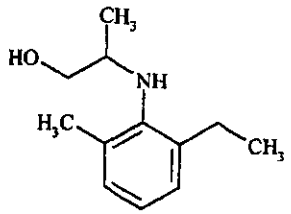
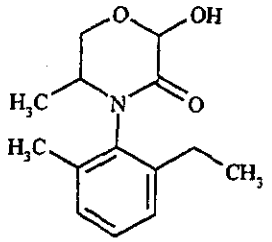
c. Residue Analytical Methods

The Pesticide Analytical Manual (PAM) Vol. II, Pesticide Regulation Section 180.368 lists a GC/NPD method (Method I) for determining residues in/on plants and a GC/MSD method (Method II) for determining residues in livestock commodities. These methods determine residues of metolachlor and its metabolites as either CGA-37913 or CGA-49751 following acid hydrolysis. Residue data from the most recent field trials and processing studies were obtained using an adequate GC/NPD method (AG-612), which is a modification of Method I.

d. Multiresidue Method Testing

Adequate data are available on the recovery of metolachlor through Multiresidue Method Testing Protocols. The FDA PESTDATA database indicates that metolachlor is completely recovered through Method 302, PAM Vol. I (3rd ed., revised 10/97).

Figure 1. Chemical names and structures of metolachlor residues of concern in plants and animals.

Common names/(Codes) Chemical name	Chemical Structure
Metolachlor (CGA-24705) 1-methylethyl) acetamide	
CGA-37913 ethylphenyl) amino]-1-propanol	
CGA-49751 4-(2-ethyl-6-methylphenyl)-2-hydroxy-5-methyl-3-morpholinone	

e. Storage Stability Data

Adequate storage stability data are available to support the crop field trials and processing studies. In plant commodities, CGA-37913 is stable at ≤-10 C for at least 2 years in corn (grain and forage), peanuts, potatoes (tubers, wet peel and flakes), soybeans (hulls and meal) and tomatoes, for at least 29 months in cottonseed oil, and for at least 37 months in cottonseed and corn oil. The derivative CGA-49751 is also stable at ≤-10 C for at least 2 years in corn (grain, forage, and oil), peanuts, potatoes (tubers, wet peel and flakes), soybeans (hulls and meal) and tomatoes, and for at least 37 months in cottonseed and cottonseed oil.

For livestock commodities, data are available indicating that CGA-49751 is stable at -15 C for up to 25 months in milk, eggs, beef liver and muscle. The derivative CGA-37913 is stable at -15 C for up to 25 months in milk and eggs, 12 months in beef liver, and 2 months in beef muscle. More recent storage stability data for CGA-37913 indicated that it is stable at -20 C in beef muscle for up to 12 months; however, HED has concluded that the original storage stability studies for beef muscle were more representative of the conditions encountered during the feeding study; therefore, the original studies would be assumed to be valid and residues of CGA-37913 in beef muscle will be corrected for loss during frozen storage.

f. Magnitude of the Residue in Crops

Adequate metolachlor residue data are available for both metolachlor and *S*-metolachlor in/on celery, corn (field and sweet), cottonseed, grasses grown for seed, potatoes, safflower, and sorghum An adequate number of field trials have been conducted on these crops and depict residues resulting from the application of metolachlor at the maximum labeled or proposed use rate. Adequate metolachlor and *S*-metolachlor data are also available for legume vegetable foliage, peanuts, soybeans, spinach, stone fruits and tree nuts provided the specified metolachlor and *S*-metolachlor label amendments are made. There are adequate metolachlor data available for tomatoes; however, copies of the labels must be provided specifying a PHI of 90 days and a maximum of one post-emergence application of 3.0 lb ai/A for metolachlor, and 1.9 lb ai/A for *S*-metolachlor. The available residue data for metolachlor are summarized below by crop.

To support current or proposed tolerances for metolachlor and *S*-metolachlor, residue data are required reflecting the maximum use rates on the following crops or commodities: (i) representative succulent, shelled peas and beans, to support the use on legume vegetables; (ii) bell peppers, to support a pending tolerance on peppers; and (iii) corn, sorghum, and soybean aspirated grain fractions.

The Agency previously requested additional metolachlor residue data on a variety of crops to replace data originally generated by Craven Laboratories (DP Barcode D167347, S. Koepke, 10/10/91; and S. Hummel, memos dated 5/4/93 and 5/27/93). All of the requested replacement residue data have been submitted and deemed adequate.

Maximum use rates for *S*-metolachlor are ~63% of the use rate for metolachlor on comparable crops. The available bridging studies on corn and soybeans indicate that residues resulting from the application of *S*-metolachlor are likely to be lower than for metolachlor; therefore, the available metolachlor residue data will support comparable uses of *S*-metolachlor provided that the labeled use rates for S-metolachlor are ~63% lower than the metolachlor use rates. However, for those uses that result in residues well above the method LOQ (0.08 ppm), such as corn forage, residue data for *S*-metolachlor will be required to reassess tolerances if *S*-metolachlor completely replaces a particular use of metolachlor. Current examples of this include the SLN uses on cabbage and dry bulb onions. Tolerances for both cabbage and dry bulb onion are 1.0 ppm, and all metolachlor SLN labels for these uses have been replaced by SLNs associated with *S*-metolachlor. Accordingly, residue data are required for *S*-metolachlor on cabbage and onions.

For cases in which the current tolerance for metolachlor is set at or near the method LOQ, such as celery (0.1 ppm), additional *S*-metolachlor residue data will not be required if the comparable use of metolachlor is canceled.

Cabbage. SLN labels for metolachlor previously allowed for a single application to transplanted cabbage at up to 3 lb ai/A. These SLNs were supported by adequate metolachlor residue data in which the combined residues (metolachlor isomers and their metabolites) were <0.02-0.80 ppm in/on cabbage harvested 62-99 days following a single application to direct-seeded or transplanted cabbage at 2-8 lb ai/A Syngenta's current labels for metolachlor, including SLNs, do not contain uses on cabbage. However, there are ten SLNs for cabbage associated with *S*-metolachlor (7.6 lb/gal EC, EPA Reg. No. 100-816), which include all the major growing regions for cabbage, with the exception of CA. These SLNs allow for a single pre- or post-emergence application of *S*-metolachlor to transplanted or direct-seeded cabbage at 1.3-1.9 lb ai/A (3.8 lb ai/A on organic soils). As the current tolerance for cabbage (1.0 ppm) is well above the method LOQ (0.08 ppm) and residues resulting from the application *S*-metolachlor are likely to be lower than from metolachlor, residue data supporting the current use of *S*-metolachlor (EC) on cabbage are required. The registrant should pursue a Section 3 registration on cabbage.

Celery. SLN labels for metolachlor **previously** allowed for a single application to transplanted celery at up to 3 lb ai/A. These SLNs were supported by adequate metolachlor residue data in which the combined residues were <0.08 ppm in/on celery. Syngenta's current labels for metolachlor, including SLNs, do not contain uses on celery; however, there are two SLNs for use on celery associated with *S*-metolachlor (7.6 lb/gal EC, EPA Reg. No. 100-816). These SLNs (WI990008 and FL990008) allow for a single pre- or post-transplanting application of *S*-metolachlor to celery at 1.3-1.9 lb ai/A. As the current tolerances for celery (0.1 ppm) are set at approximately the method LOQ (0.08 ppm), the available metolachlor residue data will support the use of *S*-metolachlor provided that the use rate for S-metolachlor is 0.63x the use rate of metolachlor.

Corn. Adequate residue data are available on both field and sweet corn reflecting the use of metolachlor (EC and G) as a combined PPI and post-emergence layby application, each at 3 lb ai/A (6 lb ai/A/season, 1x); however, additional data are required for aspirated grain fractions. Combined residues were <0.12-3.02 ppm in/on field corn forage collected 29-32 days post-treatment and 0.27-3.1 ppm in/on sweet corn forage and <0.08-<0.10 ppm in/on ears (K+CWHR) collected 29-50 days post-treatment. At maturity, combined residues were <0.08 ppm in/on field corn grain and 0.11-1.33 ppm in/on field corn fodder.
Data are also available from recent bridging studies using field and sweet corn to compare residues of metolachlor and *S*-metolachlor. In eight side-by-side field corn trials, residues of metolachlor were 0.12-2.75 ppm in/on forage (30 days post-treatment), <0.10-2.81 ppm in/on fodder, and <0.08 ppm in/on grain harvested following PPI and post-emergence applications (3 + 3 lb ai/A) of metolachlor (EC) totaling 6 lb ai/A. Following a PPI + post-emergence application of *S*-metolachlor (EC) at 2 + 2 lb ai/A/application (4 lb ai/A/season, 1x), combined residues were <0.09-2.23 ppm in/on forage (30 days post-treatment), <0.08-1.12 ppm in/on fodder, and <0.08 ppm in/on grain.

In four side-by-side sweet corn trials, residues of metolachlor were 0.67-5.75 ppm in/on forage (29-33 days post-treatment), 0.31-5.54 ppm in/on fodder, and <0.08 ppm in/on ears (K+CWHR) harvested following PPI and post-emergence applications (3 + 3 lb ai/A) of metolachlor (EC) totaling 6 lb ai/A. Following PPI + post-emergence applications of *S*-metolachlor at 2 + 2 lb ai/A/application (4 lb ai/A/season, 1x), combined residues were 0.35-4.44 ppm in/on forage (29-33 days post-treatment), <0.08-2.29 ppm in/on fodder, and <0.08 ppm in/on ears (K+CWHR).

Cotton. Adequate metolachlor residue data are available for cottonseed. The combined residues were <0.08 ppm in/on all cottonseed samples harvested at maturity following either a single pre-emergence or PPI application of metolachlor (8 lb/gal EC) at 2 lb ai/A or a combination of a PPI and a post-emergence application, each at 2 lb ai/A (4 lb ai/A/season). No additional data are required on cottonseed.

Adequate residue data are available for residues of metolachlor in/on cotton gin byproducts. These data will cover the use of S-metolachlor in/on cotton gin byproducts. The maximum combined residues were <0.08 ppm (<LOQ) in/on undelinted cotton seeds and 3.2 ppm in/on cotton gin byproducts derived from raw cotton harvested 102-160 days following combined pre-emergence and post-emergence broadcast applications of metolachlor (8 lb/gal EC) totaling 4.0 lb ai/A (1x). Based on these data, a tolerance 4.0 ppm should be established for both metolachlor and *S*-metolachlor residues in/on cotton gin byproducts.

In three additional side-by-side trials conducted in conjunction with the above trials, the maximum combined residues were <0.08 ppm (<LOQ) in/on undelinted cotton seeds and 1.2 ppm in/on cotton gin byproducts derived from raw cotton harvested 102-160 days following combined pre-emergence and post-emergence broadcast applications of *S*-metolachlor (7.6 lb/gal EC) totaling 2.67 lb ai/A (1x). No additional data are required on cotton gin byproducts.

Grasses (grown for seed). There are currently no federal or state (SLN) registrations for use of metolachlor on grasses; however, the Agency has approved a section 18 emergency exemption for application of metolachlor to grasses grown for seed in OR, along with temporary tolerances for metolachlor in/on grass forage and hay (*FR Vol. 63, 48586, 9/11/98*). The tolerances were set to expire on 12/31/01. There is a pending petition (PP#6E04638) for a regional registration for use of metolachlor on grasses grown for seed in the Pacific Northwest (Regions 11 and 12). The proposed use would allow for a single pre-emergence application of metolachlor (8 lb/gal EC) in the fall to grasses at 2.0 lb ai/A. The proposed label specifies a 60-day PHI for forage west of the Cascades and a 150-day PHI for forage east of the Cascades. New data have been submitted and the data adequately support the proposed use of metolachlor on grasses grown for seed in the Pacific Northwest.

In six previously submitted field trials (MRID 42885701; PP#6E04638, DP Barcode D221778, G. Kramer, 2/9/96), combined metolachlor residues were 0.58-1.4 ppm in/on forage samples harvested at the proposed 60-day PHI and <0.08-0.11 ppm in/on straw samples and <0.08-0.04 ppm in/on seed screening samples harvested at maturity (240-306 days post-treatment).

In the current five crop field trials (MRID 44470101) conducted in 1995 on grasses grown for seed production in the Pacific Northwest, the combined metolachlor residues were 0.32-11.2 ppm in/on 10 forage samples harvested at the proposed PHI (60 or 150 days), following a single pre-emergence application of metolachlor (8 lb/gal EC) in the fall at 2.0 lb ai/A (1x the proposed rate). Combined residues were <0.08-0.16 ppm in/on all 10 samples of straw harvested at maturity (240-271 days post-treatment) from all five field trials. As this use is for grasses grown for seed, the straw data can be translated to support a tolerance on grass hay.

These data would supp[illegible] with a regional registration for metolachlor and *S*-me[illegible] 12.0 ppm and in/on grass hay at 0.20 ppm. Separate t[illegible] and seed screening are not required. The petitioner should [illegible]te tolerances.

[illegible]le to support uses on edible-podded and dried shelled legume vegetables (excluding soybean). Following a PPI a[illegible] at 3.0 lb ai/A (1x), combined residues were <0.08-0.44 ppm in/on edible pod[illegible] and beans and <0.08-<0.11 ppm in/on d[illegible] shelled peas and beans. However, adequate data are not available on shelled, succulen[illegible] and beans; these data are

Adequate residue data are also available for legume vegetable foliage. Following a PPI application of metolachlor at 3.0 lb ai/A (1x), combined residues were 0.44-11.5 ppm in/on pea [illegible] forage (vines) harvested 52-71 days post-treatment and 0.31-2.2 ppm in/on pea and [illegible] 100-122 days post-treatment. The labels currently specify a 120-day PHI for hay, but do not specify a PHI for forage.

Onion, dry bulb. SLN labels for metolachlor have previously allowed for up to two post-emergence applications of metolachlor (EC) to dry bulb onions at up to 2 lb ai/A/application. These SLNs were supported by adequate residue data from five trials in which the combined residues were <0.08-<0.43 ppm in/on dry bulb onions harvested 40-120 days following the second of two applications at 1-3 lb ai/A. Syngenta's current labels for metolachlor, including SLNs, do not contain any uses on onions; however, there are a total of 13 SLNs for use on dry bulb onions associated with *S*-metolachlor (7.6 lb/gal EC, EPA Reg. No. 100-816), which include all the major growing regions for onions, with the exception of CA. These SLNs allow for two post-emergence applications of *S*-metolachlor at 1.3 lb ai/A and specify a 60-day PHI. As the current tolerance for onions (1.0 ppm) is well above the method LOQ (0.08 ppm) and residues resulting from the *S*-metolachlor application are likely to be lower than from metolachlor, residue data are required supporting the current use of *S*-metolachlor (EC) on dry bulb onions. The registrant should pursue a Section 3 registration on onion.

Peanut. Following a single PPI application of metolachlor (25% G) at 3.0 lb ai/A, metolachlor residues were <0.08-0.12 ppm in/on nutmeats and 0.63-3.72 ppm in/on hay. The remaining data reflect one or two applications of an EC formulation at 3.0 lb ai/A/application, for a total of 6 lb

ai/A/season. In these trials, the combined residues were <0.08-0.23 ppm in/on nutmeats and 0.75-40.5 ppm in/on hay; however, the current metolachlor 8 lb/gal EC labels only allow for a maximum of 4 lb ai/A/season (PPI at 2 lb ai/A + Layby at 2 lb ai/A).

The results from 11 crop field trials (MRID 44755401) conducted on peanuts during 1996 and 1997 have shown that the maximum combined residues were 0.19 ppm in/on peanut nutmeats and 16.5 ppm in/on peanut hay harvested at maturity, 74-94 days following combined pre-emergence and post-emergence layby broadcast applications of metolachlor (7.8 lb/gal EC) totaling 4.0 lb ai/A (1x).

In [illegible]-side trials conducted in conjunction with the above trials, the maximum combined residues of S-metolachlor were <0.09 ppm in/on nutmeats and 4.19 ppm in/on hay harvested 86-[illegible] combined pre-emergence and post-emergence layby broadcast applications of [illegible] (7.6 lb/gal EC) totaling 2.67 lb ai/A (1x).

The peanut field trial data, reflecting the lower application rate of metolachlor (4.0 lb ai/A [illegible] support lowering the tolerance for metolachlor and *S*-[illegible] residues on peanut [illegible]meats and peanut hay to 0.2 ppm and 20.0 ppm, respectively. The current tolerances for peanut forage should be revoked for both metolachlor and *S*-metolachlor.

Peppers. SLN labels for metolachlor have previously allowed for a single application of metolachlor (EC) to a variety of peppers at up to 2 lb ai/A as a pre-emergence application to direct-seeded peppers or as a post-emergence application after transplanting or up to layby (tabasco peppers only). These SLNs were supported by adequate metolachlor residue data on chili peppers (<0.02-0.03 ppm), cubanelle peppers (0.03-0.04 ppm), and bell peppers (<0.02-0.108 ppm) harvested at ≥60 days post-treatment and on tabasco peppers (0.09-0.45 ppm) harvested at 7 or 14 day post-treatment.

Syngenta's current labels for metolachlor, including SLNs, do not contain any uses on peppers; however, there are a total of 11 SLNs for use on various types of peppers associated with *S*-metolachlor [7.6 lb/gal EC, EPA Reg. No. 100-816]. With the exception of the use on tabasco peppers [SLN No. LA990013], these SLNs allow for a single pre- or post-emergence application of *S*-metolachlor at 1.0-1.3 lb ai/A with PHIs of 60-65 days. The use on tabasco is for an post-emergence directed application at layby at 2.5 lb ai/A with a 7-day PHI.

There is a pending metolachlor tolerance petition (PP#4E4420) for increasing the single maximum rate of metolachlor to 3.0 lb ai/A and establishing a tolerance of 0.5 ppm in/on peppers. The most recent reviews of this petition (DP Barcode D208816, M. Rodríguez, 6/29/95, and DP Barcode D223350, M. Rodríguez, 3/8/96) indicated that additional metolachlor residue data were required from three more field trials on bell peppers, one each in Regions 5, 6, and 10; therefore, additional metolachlor data are required to establish general metolachlor and *S*-metolachlor tolerances on peppers.

Potato. Adequate data are available depicting residues of metolachlor in/on potatoes following pre and post-emergence applications totaling 5.5 lb ai/A. Combined residues in/on mature potatoes treated at 1x were <0.08-0.14 ppm. These data will also cover the use of *S*-metolachlor.

Radish (grown for seed). An earlier SLN label for metolachlor previously allowed for a single PPI application of metolachlor (EC) at up to 2 lb ai/A to radishes grown for seed. There are no longer any SLN labels for this use associated Syngenta's labels for metolachlor; however, there are two SLNs (OR990011 and WA990005) for use on radishes grown for seed that are associated with *S*-metolachlor [7.6 lb/gal EC, EPA Reg. No. 100-816], which allow for a single PPI application at 1.3 lb ai/A. The label directions prohibit using any portion of the treated crop for human or animal consumption. The Metolachlor RED previously concluded that this label restriction was not practical, and required supporting residue data; however, this use is considered to be a non-feed/food use.

Safflower. Adequate data are available depicting metotolachor residues in/on safflower. Residues of metolachlor were <0.08 ppm in/on safflower seed following a single PPI application of metolachlor (EC) at up to 5x the maximum labeled rate (15 lb ai/A). These data will also cover the use of *S*-metolachlor.

Sorghum. Adequate data are available depicting residues of metolachlor in/on sorghum grain, forage, and fodder (stover) following a single preplant or pre-emergence application of metolachlor at 2.5 lb ai/A (1x); however, data are required for aspirated grain fractions. For sorghum forage harvested 55-11 days post-treatment (1x), residues of CGA-37913 were <0.03-0.34 ppm and residues of CGA-49751 were ≤0.05-0.11 ppm, for combined residues of <0.08-0.45 ppm. For sorghum fodder (stover) harvested 85-169 days post-treatment (1x), residues of CGA-37913 were 0.06-1.90 ppm and residues of CGA-49751 were <0.05-1.29 ppm, for combined residues of <0.11-3.19 ppm. Combined residues in/on sorghum grain harvested at maturity were <0.08-<0.19 ppm following an application at 2 lb ai/A (0.8x), with the exception of one outlier at 0.32 ppm, and combined residue were <0.08-<0.42 ppm following an application at 5 lb ai/A (2x). These data will also cover the use of *S*-metolachlor.

Soybean. Adequate residue metolachlor and *S*-metolachlor data are available on soybean seeds, forage and hay reflecting the use of metolachlor. Following a PPI or pre-emergence application of metolachlor (EC or G) at 2-4 lb ai/A, the combined residues were <0.08-<0.18 ppm in/on seeds harvested at maturity and 0.15-4.37 ppm in/on forage harvested 30-92 days post-treatment. Residues were <0.08-2.46 in/on soybean fodder (mature) harvested 118-194 days post-treatment. Residues were also 0.38-6.90 ppm in/on a limited number of hay samples collected 59-73 days post-treatment. Two hay samples also bore residues of 9.8 and 10.7 ppm; however, these high values were attributed to use of the 4 lb ai/A rate, which is only allowed on soils with organic matter contents of 6-20%.

Soybean residue data are also available from recent bridging studies comparing residues of metolachlor to *S*-metolachlor. In four side-by-side trials, metolachlor and *S*-metolachlor were applied as a PPI application at 4.0 and 2.67 lb ai/A, respectively, which are the respective

maximum use rates on soils with high organic matter (6-20%). The combined residues were 0.28-1.57 ppm in/on forage and 0.89-5.64 ppm in/on hay harvested ~30 days post-treatment, and <0.09 ppm in/on grain harvested at maturity, with the exception of two grain samples with residues of 0.24 ppm. The combined residues of *S*-metolachlor were 0.28-1.23 ppm in/on forage and 0.74-5.83 ppm in/on hay harvested ~30 days post-treatment, and <0.17 ppm in/on grain harvested at maturity.

The results from 20 crop field trials (MRID 44516802) conducted on soybeans during 1996 and 1997 have shown that the maximum combined residues of CGA-37913 and CGA-49751, each expressed as parent *S*-metolachlor, were <0.13 ppm in/on soybean seeds harvested at maturity, 86-104 days following a post-emergence application of *S*-metolachlor (7.6 lb/gal EC) at 1.33 lb ai/A (1x proposed rate). No data were submitted on residues in/on soybean forage or hay. In four related trials conducted at exaggerated rates, the combined residues were <0.08 ppm in/on soybean seeds harvested 91 days following a post-emergence application at 3.99 or 6.7 lb ai/A (3x or 5x).

The field trial data on soybeans are adequate to support the use of a single post-emergence application of *S*-metolachlor to soybeans prior to full bloom at 1.33 lb ai/A, provided that labels are amended to (i) prohibit grazing or harvest of soybean forage and hay following the post-emergence use, (ii) prohibit the use of a preplant or pre-emergence application in conjunction with the post-emergence application, and (iii) specify a 90-day PHI for mature seeds. Provided that these label amendments are made, the available data indicate that residues in/on soybeans resulting from a post-emergence application of *S*-metolachlor at 1.33 lb ai/A will not exceed the established 0.2 ppm tolerances for metolachlor and *S*-metolachlor residues in/on soybeans.

Spinach. There are currently no federal or state (SLN) registrations for use of metolachlor on spinach; however, the Agency has approved a section 18 emergency exemption for application of metolachlor to spinach in AR, OK, TX, and VA, along with a temporary tolerance of 0.3 ppm for metolachlor in/on spinach (*FR Vol. 61, 60617, 11/29/96*). This use allows for a single pre-emergence application of metolachlor (8 lb/gal EC) to spinach at 0.75-1.0 lb ai/A/crop, with a maximum of 3 applications per season (3 crops). The tolerance is currently set to expire on 6/30/02.

The results from 11 crop field trials (MRID 44615401) conducted on spinach during 1994 and 1995 have shown that the combined residues of CGA-37913 and CGA-49751, each expressed as parent metolachlor, were <0.08-<0.38 ppm in/on 22 samples of spinach harvested 34-69 days following a single pre-emergence soil application of metolachlor (8 lb/gal EC) at 1.0 lb ai/A (1x proposed rate/crop). Combined residues were also <0.08-0.263 ppm in/on 10 samples of spinach harvested 41-69 days following an pre-emergence application at 2.0 lb ai/A (2x).

The spinach field trials are adequate provided that the proposed label directions for metolachlor (EC) on spinach are amended to specify a maximum seasonal rate of 1.0 lb ai/A and a PHI of 40 days. If the petitioner intends to support the 3.0 lb ai/A seasonal rate, data would be required reflecting pre-emergence applications at 1.0 lb ai/A/crop to three successive spinach crops.

The available data indicate that a tolerance level of 0.5 ppm would be more appropriate for a permanent tolerance on spinach. In addition, these data would support a similar use of *S*-metolachlor (EC) on spinach at a maximum rate of 0.6 lb ai/A.

Stone Fruits. Adequate residue data are available supporting a single application of metolachlor to stone fruit orchards. Label directions for use on stone fruits should be amended to allow only a single application per season.

Tomato. There are currently no federal or state (SLN) registrations for use of metolachlor on tomatoes; however, the Agency has approved a section 18 emergency exemption for application of metolachlor to tomatoes in OH, IN, MI, and PA, along with temporary tolerances for metolachlor in/on tomatoes and tomato puree and paste (*FR Vol. 62, 33012, 6/18/97*). These tolerances are currently set to expire on 6/30/02.

The results from 13 crop field trials (MRID 44056101) conducted on tomatoes during 1992 have shown that the maximum combined residues of CGA-37913 and CGA-49751, each expressed as parent metolachlor, were below the limit of quantitation (<LOQ; combined <0.08 ppm) in/on 26 samples of tomatoes harvested 83-91 days following a single post-emergence application of metolachlor (EC) at 3.0 lb ai/A (1x proposed rate). Combined residues were also ≤0.08 ppm in/on tomatoes harvested 86 or 89 days following an exaggerated application at 2x (2 trials), 3x (2 trials), or 5x (1 test). In the other 5x test, combined residues were <0.11 ppm in/on tomatoes.

The registrant must provide copies of labels including the proposed use on tomatoes. Provided that label directions for metolachlor (EC) specify a maximum of one post-emergence application of 3.0 lb ai/A and a PHI of 90 days, the tomato field trial data are adequate and would support a permanent tolerance of 0.1 ppm for residues of metolachlor in/on tomatoes. These data would also support use of *S*-metolachlor (EC) on tomatoes at a maximum rate of 1.9 lb ai/A.

Tree Nuts. Adequate residue data are available supporting a single application of metolachlor to tree nut orchards. Label directions for use on tree nuts should be amended to allow only a single application per season.

g. Magnitude of the Residue in Processed Food/Feed

Adequate processing studies are available for corn, cottonseed, peanuts, potatoes, safflower, soybeans and tomatoes. The data from the corn, cottonseed and safflower studies indicate that metolachlor residues do not concentrate in processed commodities from these crops; however, the peanut, potato, soybean, and tomato processing studies indicated that there is the potential for concentration of metolachlor residues in several commodities. These data can be translated to support the use of *S*-metolachlor.

Peanut: For the peanut processing study, peanuts were treated in three trials with metolachlor (EC) as a pre-emergence broadcast application plus a post-emergence application for total application rates of 6, 18 and 30 lb ai/A (1x, 3x, and 5x). Peanuts were harvested 123 days post-

treatment and processed into nutmeats, presscake (meal), and crude and refined oil. The combined metolachlor residues in nutmeats were <0.09, 0.20 and 0.26 ppm, respectively, from the 1x, 3x, and 5x treatments. Residues in crude and refined oil were <0.08 ppm for each treatment. Combined residues in expeller presscake were 0.12, 0.33, and 0.47 ppm for the 1x, 3x, and 5x treatments, respectively. Using the data from the 3x and 5x treatments, in which quantifiable residues of both CGA-37913 and CGA-49751 were detected in nutmeats, metolachlor residues concentrated on average by 1.75x in presscake, which is representative of peanut meal. Based on the highest residue value observed in the available peanut field trials (0.23 ppm) and the 1.75x concentration factor for presscake, the maximum expected residues in peanut meal would be 0.40 ppm. As this value is higher than the reassessed metolachlor and *S*-metolachlor tolerance of 0.20 ppm for nutmeats, separate tolerances for peanut meal is required; therefore, tolerances for metolachlor and *S*-metolachlor of 0.40 ppm for peanut meal would be appropriate.

Potato: For the potato processing study, potatoes were treated in three trials with metolachlor (EC) as a pre-emergence broadcast application plus a directed application at layby for total application rates of 5.5, 16.5 and 27.5 lb ai/A (1x, 3x, and 5x). Tubers were harvested 40 days post-treatment and processed into wet peel, dry peel (not a regulated commodity), flakes and chips. Combined residues in whole tubers were <0.08, <0.09, and <0.08 ppm for the 1x, 3x, and 5x treatments. Residues did not concentrate in flakes and chips (<0.08-<0.09 ppm in all treatments). Residues in wet peel from the 1x treatment were also <0.08 ppm; however, residues in 3x and 5x wet peel indicated some concentration. Residues in two samples of 3x treated wet peel were <0.08 and <0.10 ppm, for concentrations of 0.9x and 1.1x. Residues in two samples of 5x treated wet peel were <0.13 and <0.15 ppm; for concentrations of 1.6x and 1.9x. Averaging these concentration factors (1.4x) and using the highest residue value for potatoes (0.14 ppm) from the field trials, the maximum expected residues in potato wet peel would be 0.196 ppm, which is below the current metolachlor and *S*-metolachlor 0.2 ppm tolerance for potatoes. Therefore, a separate tolerance for potato wet peel is not required.

Soybean: For the soybean processing study, soybeans were treated in three trials with metolachlor (EC) as a pre-emergence application at 4, 12, or 20 lb ai/A (1x, 3x, and 5x). Soybeans were harvested 134 days post-treatment and processed into hulls, meal, and crude and refined oil. Combined residues in soybean seeds were <0.09, <0.11, and <0.14 ppm for the 1x, 3x, and 5x treatments, respectively. Residues did not concentrate in meal (<0.08-<0.10 ppm) or oil (<0.08 ppm) from any treatment; however, residues in hulls from the three treatments were <0.10, <0.14, and <0.17 ppm, for concentration factors of 1.1x, 1.4x, and 1.2x. Averaging these concentration factors (1.2x) and using the highest residue value for soybeans (<0.18 ppm) from the field trials, the maximum expected residues in soybean hulls would be <0.22 ppm. As the current tolerance for soybeans is 0.2 ppm, a separate tolerance for soybean, hulls should be established at 0.3 ppm for metolachlor.

In a series of soybean processing studies (MRID 44516802), *S*-metolachlor (7.6 lb/gal EC) was applied to soybeans as a single foliar application to separate plots at 1.33, 3.99, and 6.7 lb ai/A (1x, 3x, or 5x the maximum proposed post-emergence application rate) at two test sites (IA and

IL). Soybeans were harvested 91 days post-treatment, and were processed into hulls, meal, and refined oil using simulated commercial procedures. Combined residues were <LOQ (<0.08 ppm) in/on seeds harvested from the four trials conducted at 1x or 3x and from one of the 5x trials. In the other 5x test, residues of CGA-37913 and CGA-49751 were 0.03 ppm and <0.05 ppm, respectively, for combined residues of <0.08 ppm.

Based on the residue data from the 5x soybean seeds and processed fractions, *S*-metolachlor residues did not concentrate in soybean oil; however, residues concentrated slightly (1.2x) in hulls and meal. Considering the highest average field trial (HAFT) residues of *S*-metolachlor in/on soybean seeds of 0.115 ppm and the average processing factors, the maximum expected residues would be 0.14 ppm in hulls and meal and 0.12 ppm in oil processed from soybeans treated at the maximum application rate. As the maximum expected residue levels in these processed commodities are below the established 0.2 ppm tolerance for soybean seeds, separate tolerances for residues in soybean processed commodities are not necessary for *S*-metolachlor.

Tomato: In a series of tomato processing studies (MRID 44056101), metolachlor (8 lb/gal EC) was applied to tomatoes as a single foliar application to separate plots at 3.0, 9.0 and 15.0 lb ai/A (1x, 3x, or 5x the maximum proposed foliar application rate) at two test sites (CA and OH). Tomatoes were harvested ~90 days post-treatment, and were processed into stewed/canned tomatoes, wet and dry pomace, juice, puree, and paste using simulated commercial procedures. Tomato puree and paste are currently the only regulated processed commodities of tomatoes.

The combined residues of CGA-37913 and CGA-49751, expressed as metolachlor, were <LOQ (<0.08 ppm) in/on tomatoes harvested ~90 days following a single foliar application of metolachlor (8 lb/gal EC) at 3.0 lb ai/A (1x proposed use rate) at both test sites. Residues of CGA-49751 were also <LOQ (<0.05 ppm) in/on tomatoes from the 3x and 5x applications, but residues of CGA-39713 were 0.03-0.04 ppm in/on tomatoes from the 3x application and 0.03-0.06 ppm in/on tomatoes from the 5x application.

Based on data from the 5x studies, residues do not appear to concentrate in stewed tomatoes and juice, and concentrated only slightly in wet pomace (1.2x) and puree (1.4x). Concentrations were more substantial in dry pomace (3.3x) and paste (2.2x).

As residues were <LOQ (<0.08 ppm) in/on all 26 tomato samples from the 1x field trials (13 trials), the maximum expected residues can be extrapolated using the maximum residue values for each processed fraction from the 5x application. Using this method, the maximum expected residues resulting from a 1x application of metolachlor would be 0.03 ppm in puree and 0.05 ppm in paste. As these levels are below the 0.1 ppm temporary tolerance for tomatoes, the established temporary tolerances, set to expire 6/30/02 [40 CFR §180.368(b)] for metolachlor residues in/on tomato puree (0.3 ppm), and tomato paste (0.6 ppm) are not necessary. These data can also be translated to support the use of S-metolachlor on tomatoes at 0.63x the maximum metolachlor rate.

h. Magnitude of the Residue in Meat, Milk, Poultry, and Eggs

Tolerance reassessment requirements for magnitude of the residue in meat, milk, poultry, and eggs are fulfilled. Adequate ruminant and poultry feeding studies are available for metolachlor, and these data will also support the use of *S*-metolachlor.

The maximum theoretical dietary burdens (MTDB) for livestock are calculated below in the table. Based on diets consisting of sorghum grain and peanut meal, the MTBD for poultry and swine are 0.350 and 0.315 ppm, respectively. The MTDB for cattle was calculated to be 16.2 ppm based on a diet including corn forage, legume forage, sorghum grain, and peanut meal. In determining anticipated residues for metolachlor, the Agency has previously calculated dietary burdens ranging from 0.028-3.187 ppm for dairy cows (DP Barcode D194942, S. Knizner, 11/18/93). These lower dietary burdens reflected the inclusion of data on the percent crop treated.

Calculation of Maximum Dietary Burdens of Livestock Animals for Metolachlor

Feed Commodity	% Dry Matter [a]	% Diet [a]	Reassessed Tolerances (ppm)	Dietary Contribution [b] (ppm)
Beef and Dairy Cattle				
corn forage	40	40	6.0	6.00
legume forage	30 [c]	20	15.0	10.0
sorghum grain	86	30	0.3	0.10
peanut meal	85	10	0.4	0.06
TOTAL BURDEN				**16.16**
Poultry				
sorghum grain	NA	75	0.3	0.225
peanut meal	NA	25	0.4	0.125
TOTAL BURDEN				**0.350**
Swine				
sorghum grain	NA	70	0.3	0.210
peanut meal	NA	15	0.4	0.075
potato waste	NA	15	0.2	0.030
TOTAL BURDEN				**0.315**

[a] Table 1 (August 1996).
[b] Contribution = [tolerance / % DM (if cattle)] X % diet).
[c] Based on %DM of cowpea forage.

In the available ruminant feeding study, dairy cows were administered metolachlor at a level equivalent to 60 ppm in the feed for up to 28 consecutive days. Animals were dosed by: 1) mixing the compound in the feed; 2) orally via gelatin capsules; and 3) intra-rumen injections. Milk samples for residue analysis were collected on days 0, 1, 4, 7, 12, 14, 21, and 28, and cows were sacrificed at 14, 21, and 28 days. There were no detectable residues of CGA-37913

(<0.006 ppm) or CGA-49751 (<0.01 ppm) in any of the milk samples, and there were no detectable residues of CGA-37913 (<0.02 ppm) and CGA-49751 (<0.02 ppm)in any tissues except liver or kidney. If residues in beef muscle are corrected for decline of CGA-37913 residues during storage, the maximum combined residues in beef muscle would be <0.06 ppm . At each sampling interval, residues in liver were comprised of CGA-37913 at 0.11 ppm and CGA-49751 at 0.02 ppm, for combined residues of 0.13 ppm. In kidney, residues of CGA-37913 were 0.14-0.36 ppm and residues of CGA-49751 were 0.05-0.06 ppm, for combined residues of 0.20-0.42 ppm.

Based upon a MTDB of 16.2 ppm for cattle, the 60 ppm dose level in the ruminant feeding study is equivalent to 3.7x the MTDB for cattle. Extrapolating the residue data from the ruminant study to a 1x feeding level for cattle, the maximum combined residues would be 0.004 ppm in milk, 0.011 ppm in fat, 0.016 ppm in meat, 0.035 ppm in liver, and 0.11 ppm in kidney. As these residue levels are below the method LOQ in milk, fat, meat, and liver, the tolerance for residues in milk should remain at 0.02 ppm, and the tolerances for residues in fat, meat, and meat byproducts (except kidney) should be set at the method LOQ of 0.04 ppm. The separate tolerance for liver should be revoked, and the separate tolerance for kidney should remain at 0.2 ppm. Tolerances for goats, horses, and sheep should also be changed accordingly.

Based upon a MTDB of 0.315 ppm for swine, the 60 ppm dose level in the ruminant feeding study is equivalent to 190x the MTDB for swine. Extrapolating the residue data from the ruminant study to a 10x feeding level for swine, maximum combined residues would be 0.007 ppm in liver and 0.022 ppm in kidney. As these levels are below the LOQ for the current enforcement method, there is no reasonable expectation of finding quantifiable residues of metolachlor in hog tissues [40 CFR 180.6(a)(3)]. Accordingly, tolerances for hog commodities should be revoked.

In the available poultry feeding study, laying hens were fed metolachlor at levels of 0, 0.1, 0.5, and 2.0 ppm in the diet. These feeding levels are equivalent 0.3x, 1.4x, and 5.7x the MTDB for poultry. Eggs samples were taken on days 1, 3, 7, 10, 14, and 21, and birds were sacrificed after 7, 14, 21, and 28 days for tissue analysis. Only tissues from the two highest feeding levels (0.5 and 2.0 ppm) were analyzed. No detectable residues were found in egg whites or egg yolks (<0.02 ppm for CGA-37913 and <0.04 ppm for CGA-49751), and no detectable residues of CGA-37913 (<0.02 ppm) or CGA-47951 (<0.04 ppm) were found in any tissues (meat, fat, and liver). As residues of both analytes were not detected in eggs and tissues of poultry dosed at up to 5.7x the calculated MTDB, tolerances for eggs and poultry tissues should be reassessed to the combined LOQ (0.04 ppm) for the current tolerance enforcement method.

i. Analytical Reference Standards

Analytical reference standards must be supplied as requested by the EPA National Pesticide Standards Repository for metolachlor, *S*-metolachlor, and all metabolites of concern.

j. Confined Accumulation in Rotational Crops

After review of rotational crop data was transferred to HED, the confined rotational crop study for metolachlor was reevaluated by HED (DP Barcode D207842, S. Hummel, 10/12/94). HED concluded that the available study was inadequate but potentially upgradeable. Additional data are required characterizing the ^{14}C-residues in plants, along with information on the percentage of the ^{14}C-residues measured by the current enforcement method, supporting storage stability data, and sample storage conditions and intervals.

k. Field Accumulation in Rotational Crops

Tomatoes. Adequate residue data are available depicting metolachlor residues in/on tomatoes planted as a rotational crop 6 months following a single application of metolachlor (EC) at 4.0 or 8.0 lb ai/A to a primary crop of corn. In a total of eight field trials, residues of metolachlor were <0.08 ppm in/on all samples of tomatoes. Residues were also <0.08 ppm in tomato processed fractions from one test. Base upon these data and pending adequate data, the Agency concluded that a rotational crop tolerance was not required for tomatoes provided the label specifies a tentative 6-month plant-back interval.

Nongrass livestock feeds. Adequate data are available depicting metolachlor residues in/on forage and hay of alfalfa (7 trials) and clover (7 trials) planted as rotational crops ~4 months following a single application of metolachlor (EC) at 3.0 lb ai/A to a primary crop of corn. The resulting residues of metolachlor were <0.08-<0.30 ppm in/on alfalfa forage, <0.08-0.47 ppm in/on alfalfa hay, <0.08-0.54 ppm in/on clover forage, and <0.08-0.38 ppm in/on clover hay.

Cereal grains. The available residue data supporting indirect or inadvertent tolerances in/on cereal grain crops are not adequate. The available data reflect plant-back intervals of 6-18 months; whereas, the current labels for both metolachlor and *S*-metolachlor allow rotation to barley, oats, rye and wheat at 4.5 months after application.

In four trials, the combined metolachlor residues were <0.08-<0.13 ppm in/on oat grain, <0.14-<0.15 ppm in/on forage, and <0.08-<0.13 ppm in/on fodder from oats planted 6-18 months following a single application of metolachlor (EC) at 2-4 lb ia/A to a primary corp. In 13 trials, combined metolachlor residues were <0.08-<0.15 ppm in/on wheat grain, <0.08-<0.19 ppm in/on forage, and <0.08-0.33 ppm in/on fodder and straw from wheat planted 9-14 months following a single application of metolachlor (EC) at 2-4 lb ia/A to a primary corp.

Data are required depicting residues in/on representative rotated cereal grains planted 4.5 months following a single application of metolachlor at the maximum rate for corn. Field trials should be conducted using wheat and oats, and samples of forage, hay, straw and grain should be collected from each test. The data from wheat and oats will be translated to support similar tolerances on barley, buckwheat, millet, rice, and rye. The established tolerances on milo

commodities should be revoked as residues in/on milo commodities are covered by the current tolerances on sorghum.

2. Refined Residue Estimates - Dietary Exposure Characterization

Anticipated residues of metolachlor and S-metolachlor in/on food commodities and dietary exposure estimates will be assessed in a separate memorandum.

E. TOLERANCE REASSESSMENT SUMMARY

Tolerances for residues of both metolachlor and *S*-metolachlor in or on raw agricultural commodities include the combined residues of (free and bound) metolachlor and its metabolites, determined as the derivatives, CGA-37913 and CGA-47951, each expressed as parent compound. Permanent tolerances for metolachlor residues have been established on various plant commodities ranging from 0.1 ppm in/on numerous commodities to 30.0 ppm in/on peanut forage and hay [40 CFR §180.368(a)]. Time-limited tolerances associated with section 18 emergency exemptions have been established metolachlor residues in/on grass forage and hay, spinach, and tomato commodities [40 CFR §180.368(b)]. Tolerances associated with regional registrations have also been established for metolachlor residues in/on dry bulb onions, cabbage, and various peppers (chili, Cubanelle, and tabasco) [40 CFR §180.368(c)].

Tolerances for metolachlor currently cover residues of *S*-metolachlor on the same commodities for the same use pattern when the maximum use rate of *S*-metolachlor is 0.63x the use rate of metolachlor. Separate tolerances should be established under §180.368 for *S*-metolachlor. Tolerances for metolachlor should be listed under §180.368(a)(1) through (d)(1), and tolerances for *S*-metolachlor should be listed under §180.368(a)(2) through (d)(2). A summary of the tolerance reassessment and recommended modifications in commodity definitions for metolachlor and *S*-metolachlor are presented in Tables 4a and 4b, respectively.

The available residue data support the existing tolerances on the following crops/commodities: almond hulls, celery, corn grain and K+CWHR, cottonseed, foliage of legume vegetables, potatoes, safflower seeds, sorghum grain, soybean and hay, stone fruits, and tree nuts. The available data support lowering tolerances on corn forage and stover, peanut nutmeat and hay, nongrass livestock feeds, sorghum forage, and soybean forage, and increasing the tolerance on sorghum stover and spinach.

Based upon the available legume vegetable data, the current tolerance on seed and pod vegetables (excluding soybean) should be replaced by separate tolerances on the crop subgroups for edible-podded legume vegetables, dried shelled peas and beans (except soybeans), and succulent shelled peas and beans. The soybean processing study indicates that a separate tolerance should be established for soybean hulls and peanut processing data indicate that a separate tolerance should be established for peanut meal.

Tolerances on peanut forage and rice forage should be revoked as these are no longer regulated commodities, and tolerances on milo commodities should be revoked as these commodities are covered by tolerances on sorghum commodities.

Additional residue data are required to reassess tolerances for the following crops/commodities: cabbage, dry bulb onions, peppers, grass hay and forage, succulent shelled peas and beans, representative rotational cereal grains.

Tolerances for residues of metolachlor in/on commodities of barley, buckwheat, millet, oats, rice, rye, wheat, and the nongrass livestock feeds group were initially established to cover residues of metolachlor in these crops when they were planted as rotational crops following a primary crop that was treated with metolachlor. Tolerances on these crops are currently listed in Section §180.368(a). These tolerances on these crops should be reassigned to Section §180.368(d) which is reserved for indirect or inadvertent residues.

For livestock commodities, the available feeding studies and calculated MTDBs for livestock indicate that the existing tolerances are adequate for milk and kidneys of cattle, goats, horses, and sheep. Tolerances for all hog commodities should be revoked, along with the separate tolerances for liver of livestock and poultry. Tolerances for eggs, fat, meat and meat byproducts of poultry, and the fat, meat, and meat byproducts (excluding kidney) of cattle, goats, horse, and sheep should be increased to 0.04 ppm, which is the method LOQ for the current enforcement method.

Separate tables are given below for tolerance reassessment of metolachlor and *S*-metolachlor. The Agency acknowledges that there are pending tolerance petitions for asparagus, carrots, grass forage and hay, peppers, rhubarb, sugar beets, sunflowers, and Swiss chard that are not included in this assessment. These petitions will be reviewed by the Agency in the future.

1. Tolerance Reassessment Table for Metolachlor

Table 4a. Tolerance Reassessment Summary for Metolachlor.

Commodity	Current Tolerance (ppm) [a]	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances listed under 40 CFR §180.368(a):				
Almond, hulls	0.3	Data were not available for review (DNA)	TBD	
Barley, fodder	0.5	Not applicable (NA)	Reassign to 180.368(d) To be determined (TBD)	Additional data are required. The definition for fodder should be changed to *Barley, straw*
Barley, grain	0.1			
Buckwheat, grain	0.1			
Cabbage	1.0	NA	Revoke	Registered uses (SLNs) on cabbage have been canceled.
Cattle, fat	0.02	Extrapolating to a 1x feeding level, maximum combined residues would be <0.011 ppm in fat, <0.016 ppm in meat, 0.035 ppm in liver, and 0.11 ppm in kidney.	0.04	Tolerances for fat, meat, and meat byproducts (except kidney) should be set at the method LOQ of 0.04 ppm. The tolerance for liver should be revoked, and the tolerance for kidney should remain at 0.2 ppm.
Cattle, kidney	0.2		0.20	
Cattle, liver	0.05		Revoke	
Cattle, meat	0.02		0.04	
Cattle, meat byproducts (exc. liver and kidney)	0.02		0.04	
Celery	0.1	NA	Revoke	Registered uses (SLNs) on celery have been canceled.
Corn, fodder	8.0	field (0.11-2.81) sweet (0.24-5.54)	6.0	*Corn, Stover.* The available metolachlor residue data indicate that the tolerance can be lowered to 6.0 ppm
Corn, forage	8.0	field (<0.12-3.02) sweet (0.27-5.75)	6.0	The available metolachlor residue data indicate that the tolerance can be lowered to 6.0 ppm
Corn, fresh (inc. sweet) (K+CWHR)	0.1	<0.08-<0.10	0.10	*Corn, sweet (K+CWHR)*
Corn, grain	0.1	<0.08	0.10	
Cotton, undelinted seed	0.1	<0.08	0.10	
Egg	0.02	Residues were not detected in eggs of hens dosed at up to 5.7x the MTDB	0.04	The tolerance for eggs should be set at the combined LOQ for the enforcement method.

(continued; footnotes follow)

Table 4a. Continued.

Commodity	Current Tolerance (ppm) [a]	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Goat, fat	0.02	See cattle above	0.04	See cattle above.
Goat, kidney	0.2		0.20	
Goat, liver	0.05		Revoke	
Goat, meat	02		0.04	
Goat, meat byproducts (exc. liver and kidney)	[illegible]		0.04	
Hog, fat	[illegible]			Based on the results of the [illegible] feeding study and a MRDH for swine of 0.315 [illegible] expectation of finding [illegible]able residues in hog tissues [40 CFR 180.6(a)(3)].
Hog, liver	[illegible]			
[illegible]	[illegible]			
Hog, meat byproducts (liver and kidney)				
Horse, kidney	[illegible]	[illegible]	[illegible]	See cattle above.
Horse, liver	[illegible]		[illegible]	
Horse, meat	0.02		[illegible]	
Horse, meat byproducts (exc. liver and kidney)	0.02			
Legume vegetables group foliage (exc. soybean forage and hay)	15.0	forage (0.44-11.5) hay (0.31-2.2)	15	Residue data for forage (vines) reflect a ~60-day PHI and residue data on hay reflect at 120 day PHI.
Milk	0.02	Extrapolating to a 1x feeding level, maximum combined residues in milk would be 0.004 ppm	0.02	
Millet, fodder	0.5	NA	Reassign to 180.368(d) TBD	Additional data are required. The definition for fodder should be changed to *millet, straw.*
Millet, forage	0.5			
Millet, grain	0.1			
Milo, fodder	0.5	NA	Revoke	Residues on milo commodities are covered by tolerances on sorghum.
Milo, forage	0.5			
Milo, grain	0.1			
Nongrass aminal feed (forage, fodder, straw, hay) group	3.0	forage - <0.08-0.54 hay - <0.08-<0.47	1.0 Reassign to 180.368(d)	The available alfalfa and clover data indicate that the tolerance can be reduced to 1.0 ppm.

(continued; footnotes follow)

Table 4a. Continued.

Commodity	Current Tolerance (ppm) *	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Oats, fodder	0.5	NA	Reassign to 180.368(d) TBD	Additional data are required. The definition for fodder should be changed to *oats, straw.*
Oats, forage	0.5			
Oats, grain	0.1			
Peanut	0.5	<0.08-0.19	0.20	*Peanut, nutmeats.* New residue data indicate that the tolerance can be lowered to 0.2 ppm.
Peanut, forage	30.0	NA	Revoke	Peanut forage is no longer listed as a regulated commodity of peanuts
Peanut, hay	30.0	1.04-16.5	20.0	New residue data indicate that the tolerance can be lowered to 20.0 ppm.
Peppers, bell	0.1	<0.02-0.108	Revoke	Registered uses (SLNs) on peppers have been canceled.
Potato	0.2	<0.08-0.14	0.20	
Poultry, fat	0.02	Residues were not detected in tissues of hens dosed at up to 5.7x the MTDB	0.04	Tolerances for poultry tissues should be set at the combined LOQ for the enforcement method, and the separate tolerance for liver should be revoked.
Poultry, liver	0.05		Revoke	
Poultry, meat	0.02		0.04	
Poultry, meat byproducts (exc. liver)	0.02		0.04	
Rice, fodder	0.5	NA	Reassign to 180.368(d) TBD	Additional data are required. The tolerance for rice forage should be revoked as it is not a regulated commodity, and the definition for fodder should be changed to *rice, straw.*
Rice, forage	0.5		Revoke	
Rice, grain	0.1		Reassign to 180.368(d) TBD	
Rye, fodder	0.5	NA	Reassign to 180.368(d) TBD	Additional data are required. The tolerance for rye fodder should be changed to *rye, straw.*
Rye, forage	0.5			
Rye, grain	0.1			
Safflower, seed	0.1	<0.08	0.10	

(*continued; footnotes follow*)

Table 4a. Continued.

Commodity	Current Tolerance (ppm) [a]	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Seed and pod vegetables (exc.soybean)	0.3	<0.08-0.44	0.50	*Edible-podded legume vegetables subgroup.* The available data support a tolerance of 0.5 ppm on this subgroup.
		<0.08-<0.11	0.10	*Dried shelled pea and bean (except soybean) subgroup* The available data support a tolerance of 0.1 ppm on this subgroup.
		NA	TBD	*Succulent shelled pea and bean subgroup* Data are required for this subgroup.
Sheep, fat	0.02	see cattle above	0.04	See cattle above
Sheep, kidney	0.2		0.20	
Sheep, liver	0.05		revoke	
Sheep, meat	0.02		0.04	
Sheep, meat byproduct (exc. liver and kidney)	0.02		0.04	
Sorghum grain, fodder	2.0	<0.11-3.19	4.0	*Sorghum grain, stover* The available data support increasing the tolerance on stover to 4.0 ppm and decreasing the tolerance on forage to 1.0 ppm
Sorghum grain, forage	2.0	<0.08-0.45	1.0	
Sorghum grain, grain	0.3	0.08-0.19	0.30	
Soybean	0.2	<0.08-<0.18	0.20	*Soybean, seed*
Soybean, forage	8.0	0.15-4.37	5.0	The available data indicate that the tolerance on forage can be lowered to 5.0 ppm
Soybean, hay	8.0	0.38-6.90	8.0	
Fruit, stone, group	0.1	<0.08-0.08	0.10	Available data support a single application to stone fruit and tree nut orchards
Nuts, tree, group	0.1	<0.08-0.08	0.10	
Wheat, fodder	0.5	NA	Reassign to 180.368(d) TBD	Additional data are required. The definition for fodder should be changed to *wheat, straw.*
Wheat, forage	0.5			
Wheat, grain	0.1			

(*continued; footnotes follow*)

Table 4a. Continued.

Commodity	Current Tolerance (ppm) [a]	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Time-limited Tolerances Listed under 40 CFR §180.368(b):				
Grass, forage	10.0 [b]	0.04-8.4	10	Permanent tolerances are pending.
Grass, hay	0.2 [b]	<0.08-0.11	0.20	
Spinach	0.3 [b]	<0.08-0.38	0.50	New data support an increased permanent tolerance for metolachlor residues of 0.5 ppm in/on spinach (PP# 8E5011).
Tomato	0.1 [c]	<0.08-0.08	0.10	New data support a permanent tolerance for metolachlor residues of 0.1 ppm in/on tomatoes (PP#6F4751).
Tomato, puree	0.3 [c]	<0.10	Revoke	New data indicate that the tolerances for metolachlor residues in tomato paste and puree are not necessary.
Tomato, paste	0.6 [c]	<0.10	Revoke	
Tolerances with Regional Registrations Listed under 40 CFR §180.368(c):				
Onion, dry bulb	1.0	<0.08-<0.43 ppm	Revoke	Registered uses (SLNs) of metolachlor on onions and various peppers have been canceled.
Pepper, chili	0.5	<0.02-0.03	Revoke	
Pepper, tabasco	0.5	0.09-0.45	Revoke	
Pepper, cubanelle	0.1	0.03-0.04	Revoke	
Tolerances Needed under 40 CFR §180.368(a)(1):				
Cotton, gin byproducts	None	0.08-3.2	4.0	New residue data indicates that a tolerance of 4.0 ppm may be established.
Peanut, meal	None	<3.85	0.40	The available processing data indicates that residues concentrate in presscake (1.75x).

[a] Expressed in terms of metolachlor
[b] Time limited tolerances on grass forage and hay and spinach were set to expire on 12/31/01.
[c] Time limited tolerances on tomato commodities are set to expire on 6/30/02.
[d] Based on current residue data for peanuts, additional data are required to support the current lower use rate.

2. Tolerance Reassessment Table for *S*-Metolachlor

Table 4b. Tolerance Reassessment Summary for *S*-Metolachlor.

Commodity	Current Tolerance (ppm)	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances needed under 40 CFR §180.368(a)(2):				
Cabbage	1.0	NA	TBD	Additional data are required to support the use of *S*-metolachlor on cabbage and the registrant should pursue a section 3 registration.
Cattle, fat	0.02	Extrapolating to a 1x feeding level, maximum combined residues would be <0.011 ppm in fat, <0.016 ppm in meat, 0.035 ppm in liver, and 0.11 ppm in kidney.	0.04	Tolerances for fat, meat, and meat byproducts (except kidney) should be set at the method LOQ of 0.04 ppm, but the tolerance for kidney should remain at 0.2 ppm.
Cattle, kidney	0.2		0.20	
Cattle, meat	0.02		0.04	
Cattle, meat byproducts (exc. kidney)	0.02		0.04	
Celery	0.1	<0.08	0.10	The available metolachlor data support a tolerance of 0.10 ppm for *S*-metolachlor.
Corn, fodder	8.0	field (0.11-2.81) sweet (0.24-5.54)	6.0	*Corn, Stover*: The available metolachlor residue data indicate that the tolerance can be lowered to 6.0 ppm
Corn, forage	8.0	field (<0.12-3.02) sweet (0.27-5.75)	6.0	The available metolachlor residue data indicate that the tolerance can be lowered to 6.0 ppm
Corn, fresh (inc. sweet) (K+CWHR)	0.1	<0.08-<0.10	0.10	*Corn, sweet (K+CWHR)* Supported by the available metolachlor data.
Corn, grain	0.1	<0.08	0.10	*Corn, Field, grain.* Supported by the available metolachlor data.
Cotton, undelinted seed	0.1	<0.08	0.10	Supported by the available metolachlor data.
Cotton, gin byproducts	NA	0.08-3.2	4.0	New metolachlor residue data indicates that a tolerance of 4.0 ppm may be established.
Egg	0.02	Residues were not detected in eggs of hens dosed at up to 5.7x the MTDB	0.04	The tolerance for eggs should be set at the combined LOQ for the enforcement method.

(*continued; footnotes follow*)

Table 4b. Continued.

Commodity	Current Tolerance (ppm) [a]	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Goat, fat	0.02	See cattle above	0.04	See cattle above
Goat, kidney	0.2		0.20	
Goat, meat	0.02		0.04	
Goat, meat byproducts (exc. kidney)	0.02		0.04	
Horse, fat	0.02	See cattle above	0.04	See cattle above.
Horse, kidney	0.2		0.20	
Horse, meat	0.02		0.04	
Horse, meat byproducts (exc. kidney)	0.02		0.04	
Legume vegetables group foliage (exc. soybean forage and hay)	15.0	forage (0.44-11.5) hay (0.31-2.2)	15	Residue data for forage (vines) reflect a ~60-day PHI and residue data on hay reflect at 120 day PHI.
Milk	0.02	Extrapolating to a 1x feeding level, maximum combined residues in milk would be 0.004 ppm	0.02	
Peanut	0.5	<0.09	0.20	*Peanut, nutmeats.* New metolachlor residue data indicate that the tolerance can be lowered to 0.2 ppm.
Peanut, hay	30.0	-4.19	20.0	New metolachlor residue data indicate that the tolerance can be lowered to 20.0 ppm.
Peppers, bell	0.1	<0.02-0.108	TBD	Additional data are required for a general tolerance on peppers.
Potato	0.2	<0.08-0.14	0.20	Supported by the available metolachlor data.
Poultry, fat	0.02	Residues were not detected in tissues of hens dosed at up to 5.7x the MTDB	0.04	Tolerances for poultry tissues should be set at the combined LOQ for the enforcement method, and the separate tolerance for liver should be revoked.
Poultry, meat	0.02		0.04	
Poultry, meat byproducts (exc. liver)	0.02		0.04	
Safflower, seed	0.1	<0.08	0.10	Supported by the available metolachlor data.

(continued; footnotes follow)

Table 4b. Continued.

Commodity	Current Tolerance (ppm)	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Seed and pod vegetables (exc.soybean)	0.3	<0.08-0.44	0.50	*Edible-podded legume vegetables subgroup.* The available data support a tolerance of 0.5 ppm on this subgroup.
		<0.08-<0.11	0.10	*Dried shelled pea and bean (except soybean) subgroup* The available data support a tolerance of 0.1 ppm on this subgroup.
		NA	TBD	*Succulent shelled pea and bean subgroup* Data are required for this subgroup.
Sheep, fat	0.02	see cattle above	0.04	See cattle above
Sheep, kidney	0.2		0.20	
Sheep, meat	0.02		0.04	
Sheep, meat byproducts (exc. kidney)	0.02		0.04	
Sorghum grain, fodder	2.0	<0.11-3.19	4.0	*Sorghum, stover.* The available data support increasing the tolerance on stover to 4.0 ppm and decreasing the tolerance on forage to 1.0 ppm
Sorghum grain, forage	2.0	<0.08-0.45	1.0	
Sorghum grain, grain	0.3	0.08-0.19	0.30	
Soybean	0.2	<0.08-<0.18	0.20	*Soybean, seed.* Supported by the available metolachlor and *S*-metolachlor data.
Soybean, forage	8.0	0.15-4.37	5.0	The available metolachlor data indicate that the tolerance on forage can be lowered to 5.0 ppm.
Soybean, hay	8.0	0.38-6.90	8.0	
Soybean, hulls	None	<0.14	None	New *S*-metolachlor data indicate that S-metolachlor residues in/on soybean hulls will not exceed the established tolerance on soybean seeds.

(*continued; footnotes follow*)

Table 4b. Continued.

Commodity	Current Tolerance (ppm) [a]	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Time-limited Tolerances needed under 40 CFR §180.368(b)(2):				
Grass, forage	10.0 [b]	0.04-8.4	10	Permanent tolerances are pending.
Grass, hay	0.2 [b]	<0.08-0.11	0.20	
Spinach	0.3 [b]	<0.08-0.38	0.50	New metolachlor data support an increased permanent tolerance for *S*-metolachlor residues of 0.5 ppm in/on spinach.
Tomato	0.1 [c]	<0.08-0.08	0.10	New metolachlor data support a permanent tolernace for *S*-metolachlor residues of 0.1 ppm in/on tomatoes.
Tomato, puree	0.3 [c]	<0.10	revoke	New metolachlor residue data indicate that the tolerances for *S*-metolachlor residues in tomato paste and puree are not necessary.
Tomato, paste	0.6 [c]	<0.10	revoke	
Tolerances with Regional Registrations needed under 40 CFR §180.368(c)(2):				
Onion, dry bulb	1.0	<0.08-<0.43 ppm	0.50	The available metolachlor residue data support lowering the tolerance to 0.5 ppm; however, additional data are required to support the use of *S*-metolachlor and the registrant should pursue a section 3 registration.
Pepper, chili	0.5	<0.02-0.03	0.10	With the exception of chili peppers, the available residue data support the current tolerances. Tolerances for chili peppers could be lowered to 0.1 ppm. If a general tolerance on peppers is established at 0.5 ppm, than these separate tolerances should be revoked.
Pepper, tabasco	0.5	0.09-0.45	0.50	
Pepper, cubanelle	0.1	0.03-0.04	0.10	

(*continued; footnotes follow*)

Table 4b. Continued.

Commodity	Current Tolerance (ppm) [a]	Range of residues (ppm)	Tolerance Reassessment (ppm)	Comment/*Correct Commodity Definition*
Tolerances Needed under 40 CFR §180.368(d)(2):				
Barley, grain	0.5	NA	TBD	Additional data are required.
Barley, hay	None			
Barley, straw	0.1			
Buckwheat, grain	0.1	NA	TBD	Additional data are required
Millet, forage	0.5	NA	TBD	Additional data are required.
Millet, grain	0.1			
Millet, hay	None			
Millet, straw	0.5			
Nongrass aminal feed (forage, fodder, straw, hay) group	3.0	forage - <0.08-0.54 hay - <0.08-<0.47	1.0	The available alfalfa and clover data indicate that the tolerance can be reduced to 1.0 ppm.
Oats, forage	0.5	NA	TBD	Additional data are required.
Oats, grain	0.1			
Oats, hay	None			
Oats, straw	0.5			
Peanut, meal	None	<3.85	0.40	The available metolachlor processing data indicates that residues concentrate in presscake (1.75x).
Rice, grain	0.1	NA	TBD	Additional data are required.
Rice, straw	0.5			
Rye, forage	0.5	NA	TBD	Additional data are required.
Rye, grain	0.1			
Rye, straw	0.5			
Wheat, forage	0.5	NA	TBD	Additional data are required.
Wheat, grain	0.1			
Wheat, hay	None			
Wheat, straw	0.5			

[a] Expressed in terms of *S*-metolachlor

[b] Time limited tolerances on grass forage and hay and spinach were set to expire on 12/31/01.

[c] Time limited tolerances on tomato commodities are set to expire on 6/30/02.

3. Codex/International Harmonization

No maximum residue limits (MRLs) for either metolachlor or *S*-metolachlor have been established or proposed by Codex, Canada, or Mexico for any agricultural commodity; therefore, no compatibility questions exist with respect to U.S. tolerances.

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[illegible] Report: Soybeans: AG-A No. 3650 I,II. [illegible] 100-583; submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL: [illegible]

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0[illegible]5726 K[illegible] [illegible] P.F. (1976) R[illegible] [illegible]ans: AG-A No. [illegible] (Unpublished study receive[illegible] [illegible]y 11, 1978 under 100-583; submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:097135-I)

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00015742 Dorr, J.; Buchholz, C. (1978) Metolachlor (Dual 6E); Atrazine (AAtrex 4L): AG-A No. 4750 I,II. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Analytical Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237817-E)

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00015744 Rose, W.; Monaco, T. (1978) Metolachlor (Dual 8E); Atrazine (AAtrex 4L): AG-A No. 4808. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Analytical Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237817-G)

00015745 Chamberlain, E.; Stahlberg, L. (1978) Metolachlor + Atrazine (Bicep 4.5L): AG-A No. 4792 I,II,III. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Analytical Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237817-H)

00015746 Luke, J.E. (1978) Metolachlor + Atrazine (Bicep¼(R)µ 4.5L): AG-A No. 4812 I,II,III. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with

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00015747 Turner, W.E. (1978) Metolachlor + Atrazine (Bicep 4.5L): AG-A No. 4863 I,II. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with Texas Agricultural Experiment Station and EN-CAS Analytical Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237817-J)

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AG-A No. 4793 A. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Analytical Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237817-K) Metolachlor + Atrazine (Bicep¼(R)µ 4.5L):

00015750 Rose, W.; Monaco, T. (1978) Metolachlor + Atrazine (Bicep 4.5L): AG-A No. 4809. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Analytical Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL: 237817-M)

00015751 Rose, W.; Worsham, D.; Slagowski, J.L. (1978) Metolachlor (Dual¼(R)µ 8E); Atrazine (AAtrex¼(R)µ 80W); Paraquat (Paraquat CL): AG-A No. 4959 I,II. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Laboratories and Chevron Chemical Co., submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237819-F)

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00015753 Schnappinger, M.G. (1979) Metolachlor (Dual¼(R)µ 8E); Atrazine (AAtrex¼(R)µ 80W); Glyphosate (Roundup¼(R)µ 4E): AG-A No. 4888 I,II. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Laboratories and ADC Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL: 237819-I)

00015754 Rose, W.; Worsham, D. (1979) Metolachlor (Dual¼(R)µ 8E); Atrazine (AAtrex¼(R)µ 80W); Glyphosate (Roundup 4E): AG-A No. 4960 I, II. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Laboratories and ADC Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL: 237819-J)

00015755 Searcy, S.; Herman, D. (1979) Metolachlor (Dual¼(R)µ 8E); Atrazine (AAtrex¼(R)µ 4L); Glyphosate (Roundup¼(R)µ 4E): AG-A No. 4983 I, II. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Laboratories and ADC Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL: 237819-K)

00015756 Kern, C.L.; Staniforth, D. (1979) Metolachlor (Dual 8E); Atrazine (AAtrex 80W or 4L); Glyphosate (Roundup 4E): AG-A No. 4999 I, II. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with Iowa State Univ., EN-CAS Laboratories and ADC Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237819-L)

00015757 Dorr, J.; Buchholz, C. (1979) Metolachlor (Dual 8E); Atrazine (AAtrex 4L); Glyphosate (Roundup 4E): AG-A No. 5004. (Unpublished study received Mar 16, 1979 under 100-583; prepared in cooperation with EN-CAS Laboratories and ADC Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237819-M)

00015760 Kincaid, L. (1979) Metolachlor + Glyphosate + Linuron; Dual 8E + Roundup 4E + Lorox 50W: AG-A No. 4763 I,II. (Unpublished study including letter dated May 23, 1978 from J.D. Riggleman to Robert A. Kahrs, received Mar 16, 1979 under 100-583; prepared in cooperation with E.I. du Pont de Nemours & Co., Inc. and ADC Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237821-B)

00015761 Schnappinger, M.G. (1979) Metolachlor + Glyphosate + Linuron; Dual 8E + Roundup 4E + Lorox 50W: AG-A No. 4886 I,II. (Unpublished study including letter dated May 23, 1978 from J.D. Riggleman to Robert A. Kahrs, received Mar 16, 1979 under 100-583; prepared in cooperation with E.I. du Pont de Nemours & Co., Inc. and ADC Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.: CDL:237821-C)

00015762 Searcy, V.; Herman, D. (1979) Metolachlor + Glyphosate + Linuron; Dual 8E + Roundup 4E + Lorox 50W: AG-A No. 4893 I,II. (Unpublished study including letter dated May 23, 1978 from J.D. Riggleman to Robert A. Kahrs, received Mar 16, 1979 under 100-583; prepared in cooperation with E.I. du Pont de Nemours & Co., Inc. and ADC Laboratories, submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237821-D)

00015763 Rose, W.; Worsham, D. (1979) Metolachlor + Glyphosate + Linuron; Dual 8E + Roundup 4E + Lorox 50W: AG-A No. 4956 I,II A. (Unpublished study including letter dated May 23, 1978 from J.D. Riggleman to Robert A. Kahrs, received Mar 16, 1979 under 100-583; prepared in cooperation with Rocky Mount Experiment Station, ADC Laboratories and E.I. du Pont de Nemours & Co., Inc., submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237821-E)

00015764 Kincaid, L. (1979) Metolachlor (Dual¼(R)μ 8E); Glyphosate (Roundup 4E); Metribuzin (Sencor 50W): AG-A No. 4765 I,II. (Unpublished study including letter dated May 23, 1978 from J.D. Riggleman to Robert A. Kahrs, received Mar 16, 1979 under 100-583; prepared in cooperation with ADC Laboratories and E.I. du Pont de Nemours & Co., Inc., submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237821-F)

00015765 Schnappinger, M.G. (1978) Metolachlor (Dual 8E); Glyphosate (Round-up 4E); Metribuzin (Sencor 50W): AG-A No. 4887 I,II. (Unpublished study including letter dated May 23, 1978 from J.D. Riggleman to Robert Kahrs, received Mar 16, 1979 under 100-583; prepared in cooperation with ADC Laboratories and E.I. du Pont de Nemours & Co., Inc., submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237821-G)

00015766 Searcy, S.; Herman, D. (1979) Metolachlor (Dual¼(R)μ 8E); Glyphosate (Roundup 4E); Metribuzin (Sencor 50W): AG-A No. 4895 I,II. (Unpublished study including letter dated May 23, 1978 from J.D. Riggleman to Robert A. Kahrs, received Mar 16, 1979 under 100-583; prepared in cooperation with ADC Laboratories and E.I. du Pont de Nemours & Co., Inc., submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237821-H)

00015767 Rose, W.; Worsham, D. (1979) Metolachlor (Dual¼(R)μ 8E); Glyphosate (Roundup 4E); Metribuzin (Sencor 50W): AG-A No. 4958 I,II A. (Unpublished study including letter dated May 23, 1978 from J.D. Riggleman to Robert A. Kahrs, received Mar 16, 1979 under 100-583; prepared in cooperation with ADC Laboratories and E.I. du Pont de Nemours & Co., Inc., submitted by Ciba-Geigy Corp., Greensboro, N.C.; CDL:237821-I)

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45533103 Hall, G. (2001) Comparative Metabolism of S Isomer (CGA-77102) and Isomer Mixture (CGA-24705) in Different Crop Species: Lab Project Number: 2509-01. Unpublished study prepared by Syngenta Crop Protection, Inc. 11 p.

2. Agency Memoranda Citations

Table 6. Agency Memoranda Citations.

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
12/28/89	None	5764-5767	F. Toghrol	J. Miller/ P. Ikeda	41164400-41164401	Metolachlor in or on Rotational and Processed Tomatoes. Amendment of 4/14/89
10/10/91	D167347	8398	S. Koepke	J. Miller	None	Metolachlor. Impact of Craven Analytical Data on Registrations.
4/13/92	D172605	9109-9119	M. Bradley	J. Miller	None	PP#0E3854. Metolachlor Anticipated Residues on Rotational Crop Tomatoes.
5/4/93	None	None	S. Hummel	J. Mitchell/ W. Waldrop	None	Metolachlor. Reevaluation of Craven Data Base.
5/27/93	None	None	S. Hummel	J. Mitchell/ W. Waldrop	None	Metolachlor. Reevaluation of Craven Data Base. Correction of May 4, 1993 memo.
11/18/93	D194942	12521	S. Knizner	J. Mitchell	None	Metolachlor. Anticipated Residues.
6/23/94	D201438	13482	S. Hummel	J. Mitchell/ W. Waldrop	43178401-43178403	Metolachlor (108801) Addendum to RED. Replacement of Craven Data on field corn, cottonseed (single application only), and soybeans. Updated Anticipated Residues.
7/28/94	D197404	12970	M. Bradley	R. Quick/ A. Kocialski	43000101	PP#4E4286. Metolachlor on Dry Bulb Onions. Evaluation of Analytical Methods and Residue Data.
9/2/94	D194844	12494	G. Kramer	J. Miller	42885701-42885707	PP#3F04251. Metolachlor in or on grasses grown for seed. Evaluation of residue data and analytical methods.
9/13/94	D206103	14160	S. Hummel	J. Mitchell/ W. Waldrop	43295701	Metolachlor. Addendum to RED. Magnitude of Residue in Legumes (Succulent and Dried).

(continued)

Table 6. Continued.

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
9/29/94	D204467	13875	S. Hummel	J. M \	43263101	Metolachlor (108801) Addendum to RED. Partial Replacement of Craven Data on peanuts.
10/4/94	D207867	14431	S. Hummel	M \	43367101	Metolachlor (108801) Addendum to RED. Replacement of Craven Data on rotational alfalfa and clover.
10/12/94	D207842	14435	S. Hummel	M	41470601	Metolachlor (108801) Addendum to RED. Confined Rotational Crop Data.
6/29/95	D208816	14655	M. Rodrígue	J	None	PP4E04420: Metolachlor in/on Peppers. Crop Group Tolerance and Increase in Application Rate. Amendment Dated September 14, 1994.
9/29/95	D207519	14400	S. Hummel	M	[illegible]	Metolachlor (108801): Craven Replacement Data for Clover and Alfalfa as Rotated Crops.
2/9/96	D221778	16717	G. Kramer	J \	None	PP#6E04638. Metolachlor in or on Grasses Grown for Seed. Evaluation of Residue Data and Analytical Methods
3/6/96	D223350	16946	M. Rodrigue	J \	None	PP4E04 Metolachlor in/on Peppers. Amendment Dated I ary 21, 1996.
4/17/96	D224977	None	G. Kramer	T M	None	PP#6E . Metolachlor in or on Grasses Grown for Seed. dment of 3/1/96 and Draft FR Notice.
7/10/96	D216069	15683	W. Cu	I	43661209-4 202	Additi Post Emergence Use of Metolachlor on Cotton aluation of analytical Method and Residue Data.
11/12/96	D226780	17250	L. Kutney	C	43928901 8903, 43928939 28912	Repl nt of Metolachlor Technical (Racemic Met or) with Alpha-Metolachlor (formerly called Chi etolachlor) Technical; Review of Bridging Data.

(continued)

Table 6. Continued.

Date	DP Barcode	CB No.	From	To	MRID Nos.	Subject
2/25/97	D222430, D224237	16790, 17038	S. Hummel	M. Metzger	43881701-43881703, 43944601	Metolachlor (108801) Reregisration Case No. 0001. Craven Replacement Data for Peanuts treated at layby; Safflower, including processed fractions; and Storage stability data on tomato, potato, and soy processed fractions
2/28/02	D280214	none	S. Kinard	Anne Overstreet	44470101	Metolachlor (108801) Reregisration Case No. 0001. Evaluation of Residue Data in/on Grasses Grown for Seed Following Application of Dual.
2/28/02	D280215	none	S. Kinard	Anne Overstreet	44516802	*S*-Metolachlor (108800) Reregisration Case No. 0001. Evaluation of Residue and Processed Food/Feed Data in/on Soybeans.
2/28/02	D280216	none	S. Kinard	Anne Overstreet	44615401	Metolachlor (108801) Reregisration Case No. 0001. Evaluation of Residue Data in/on Spinach.
2/28/02	D280217	none	S. Kinard	Anne Overstreet	44667401	Metolachlor (108801) and *S*-Metolachlor (108800) Reregisration Case No. 0001. Evaluation of Residue Data in/on Cotton Gin-byproducts.
2/28/02	D280218	none	S. Kinard	Anne Overstreet	44755401	Metolachlor (108801) and *S*-Metolachlor (108800) Reregisration Case No. 0001. Evaluation of Residue Data in/on Peanuts.
2/28/02	D280219	none	S. Kinard	Anne Overstreet	44056101	Metolachlor (108801) Reregisration Case No. 0001. Evaluation of Residue and Processed Food/Feed Data in/on Tomatoes.