8/8/97

MEMORANDUM:

SUBJECT: Section 3 Registration for Chloransulam-methyl on Soybean.

DP Barcode # - D223558;D223605

PC Code # - 129116

TO: Jim Tompkins (PM25)
Registration Division

FROM: Dan Rieder, Chief 8/8/97
Environmental Risk Branch III
Environmental Fate and Effects Division
(H7507C)

The EFED has reviewed the section 3 registration for Chloransulam-methyl for ecological risk. It is to be used for broadleaf weed control in soybeans. It is applied as a soil treatment, either preplant incorporated, preplant surface or preemergence (after planting). Chloransulam methyl represents minimal risk to terrestrial and aquatic animals. It is a low to moderate risk to terrestrial plants and minimal risk to aquatic plants.

The risk assessment is attached. Any questions concerning this review, contact me at 305-5314.

Note that this chemical will eventually be handled by ERBIV, of which Mah Shamim is the branch chief. Please route future actions on chloransulam methyl to her.

EXECUTIVE SUMMARY

Toxicity Summary:

The available acute toxicity data on the TGAI indicate that Chloransulam-methyl is practically non-toxic to birds (LD50 = >2250 mg/kg; LC50 = >5620 ppm), practically non-toxic to small mammals (LD50 =.5000 mg/kg, male rat), practically non-toxic to bees (LD50 = >25 µg/bee), practically non-toxic to slightly toxic to freshwater organisms (LC50 = >86-154 ppm), and practically non-toxic to estuarine/marine organisms (LC50 or EC50 = >111->121 ppm). For terrestrial plants, radish is the most sensitive dicot (EC25 = 0.0038 lbs ai/A) and Onion the most sensitive monocot (EC25 = 0.0016 lbs ai/A) in the seedling emergence test, and radish was the most sensitive dicot (EC25 = 0.00020 lbs ai/A) and ryegrass the most sensitive monocot (EC25 = 0.0026 lbs ai/A) in the vegetative vigor test. For aquatic plants, green algae was the most sensitive nonvascular species and duckweed the most sensitive vascular species. Chronic toxicity studies established the following NOEC values: 125 ppm and 1500 ppm for birds.

Risk Assessment:

As is typical of herbicides, chloransulam represents minimal risk to animals (aquatic and terrestrial) but represents risk to plants. Risk to terrestrial plants is low to moderate, but risk to aquatic plants is very high.

Birds: The results demonstrate that no avian acute or chronic level of concern is exceeded at the proposed use rate of Chloransulam-methyl on soybean. The restricted and endangered species LOC are also not exceeded.

Mammals: No acute risk LOC's are exceeded for Chloransulam-methyl.

Aquatic organisms: Minimal risk is anticipated for fish and invertebrates.

Plants: The risk quotients for terrestrial plants range from less than 1 to 12, which indicates low to moderate risk to terrestrial plants. The risk quotients for aquatic plants do not exceed the LOC, indicating minimal risk to aquatic plants.

1. Ecological Toxicity Data

a. Toxicity to Terrestrial Animals

i. Birds, Acute and Subacute

An acute oral toxicity study using the technical grade of the active ingredient (TGAI) is required to establish the toxicity of Chloransulam-methyl to birds. The preferred test species is either mallard duck (a waterfowl) or bobwhite quail (an upland gamebird). Results of this test are tabulated below.

Avian Acute Oral Toxicity

Species	% ai	LD50 (mg/kg)	Toxicity Category	MRID No. Author/Year	Study Classification[1]
Northern bobwhite quail *(Colinus virginianus)*	97.3	>2250	practically non-toxic	430034-07/91	Core

[1] Core (study satisfies guideline). Supplemental (study is scientifically sound, but does not satisfy guideline)

Since the LD50 falls in the range of >2000 mg/kg, Chloransulam-methyl is practically non-toxic to avian species on an acute oral basis. The guideline (71-1) is fulfilled (MRID 430034-07).

Two subacute dietary studies using the TGAI are required to establish the toxicity of Chloransulam-methyl to birds. The preferred test species are mallard duck and bobwhite quail. Results of these tests are tabulated below.

Avian Subacute Dietary Toxicity

Species	% ai	5-Day LC50 (ppm)[1]	Toxicity Category	MRID No. Author/Year	Study Classification
Northern bobwhite quail *(Colinus virginianus)*	97.3	>5620	practically non-toxic	430034-09	Core
Mallard duck *(Anas platyrhynchos)*	97.3	>5620	practically non-toxic	430034-08	Core

[1] Test organisms observed an additional three days while on untreated feed.

Since the LC50 falls in the range of 1001-5000 ppm, Chloransulam-methyl is slightly toxic to avian species on a subacute dietary basis. The guideline (71-2) is fulfilled (MRID 430034-08).

ii. Birds, Chronic

Avian reproduction studies using the TGAI are required for Chloransulam-methyl because the following conditions are met: (1) birds may be subject to repeated or continuous exposure to the pesticide, especially preceding or during the breeding season, (2) the pesticide is stable in the environment to the extent that potentially toxic amounts may persist in animal feed, (3) the pesticide is stored or accumulated in plant or animal tissues, and/or, (4) information derived from mammalian reproduction studies indicates reproduction in terrestrial vertebrates may be adversely affected by the anticipated use of the product. The preferred test species are mallard duck and bobwhite quail. Results of these tests are tabulated below.

Avian Reproduction

Species/ Study Duration	% ai	NOEC (ppm)	LOEC Endpoints	MRID No. Author/Year	Study Classification
Northern bobwhite quail *(Colinus virginianus)*	97.3	1500		436689-05/95	Core
Mallard duck *(Anas platyrhynchos)*	97.3	125		436689-06/95	Core

The guideline (71-4) is fulfilled (MRID 436689-05,-06).

iii. Mammals, Acute and Chronic

Wild mammal testing is required on a case-by-case basis, depending on the results of lower tier laboratory mammalian studies, intended use pattern and pertinent environmental fate characteristics. In most cases, rat or mouse toxicity values obtained from the Agency's Health Effects Division (HED) substitute for wild mammal testing. These toxicity values are reported below.

Mammalian Toxicity

Species/ Study Duration	% ai	Test Type	Toxicity Value	Affected Endpoints	MRID No.
laboratory rat *(Rattus norvegicus)*	97.3	LD50	>5000 mg kg^{-1}	none	430034-13

The results indicate that Chloransulam-methyl is practically non-toxic to small mammals on an acute oral basis.

iv. Insects

A honey bee acute contact study using the TGAI is required for Chloransulam-methyl because of its postemergence use in controlling broadleaf weeds in soybean result in honey bee exposure. Results of this test are tabulated below.

Nontarget Insect Acute Contact Toxicity

Species	% ai	LD50 (μg/bee)	Toxicity Category	MRID No. Author/Year	Study Classification
Honey bee *(Apis mellifera)*	97.3	>25	practically non-toxic	430034-31	Core

The results indicate that Chloransulam-methyl is practically non-toxic to bees on an acute contact basis. The guideline (141-1) is fulfilled (MRID 430034-31).

A honey bee toxicity of residues on foliage study using the typical end-use product is not required for chloransulam-methyl because even though its use on soybean may result in honey bee exposure, the acute contact honey bee LD50 is greater than 0.11 *ug*/bee. The guideline (141-2) is not required to be fulfilled.

b. Toxicity to Freshwater Aquatic Animals

i. Freshwater Fish, Acute

Two freshwater fish toxicity studies using the TGAI are required to establish the toxicity of Chloransulam-methyl to fish. The preferred test species are rainbow trout (a coldwater fish) and bluegill sunfish (a warmwater fish). Results of these tests are tabulated below.

Freshwater Fish Acute Toxicity

Species/ (Flow-through or Static)	% ai	96-hour LC50 (ppm) (measured)	Toxicity Category	MRID No. Author/Year	Study Classification
Rainbow trout *(Oncorhynchus mykiss)* static	97.3	>86	slightly toxic	430034-10	Core
Bluegill sunfish *(Lepomis macrochirus)*	97.3	>154	practically non-toxic	430034-11	Core

Since the LC50 falls in the range of >10 -100 ppm for rainbow trout and >100 ppm for bluegill sunfish, chloransulam-methyl ranges from slightly toxic to practically non-toxic to freshwater fish on an acute basis. The guideline (72-1) is fulfilled (MRID 430034-10,-11).

ii. Freshwater Fish, Chronic

A freshwater fish early life-stage test using the TGAI is not required for chloransulam-

methyl.

iii. Freshwater Invertebrates, Acute

A freshwater aquatic invertebrate toxicity test using the TGAI is required to establish the toxicity of chloransulam-methyl to aquatic invertebrates. The preferred test species is *Daphnia magna*. Results of this test are tabulated below.

Freshwater Invertebrate Acute Toxicity

Species/(Static or Flow-through)	% ai	48-hour LC50/ EC50 (ppm) (measured)	Toxicity Category	MRID No. Author/Year	Study Classification
Waterflea *(Daphnia magna)*	97.3	98	slightly toxic	430034-12	Invalid

Since the EC50 falls in the range of >10-100 ppm, chloransulam-methyl is slightly toxic to aquatic invertebrates on an acute basis. However, the guideline (72-2) is not fulfilled because of changes in filtered measured concentrations between test initiation and termination precluded determination of a valid EC*50* concentration (MRID 430034-12).

iv. Freshwater Invertebrate, Chronic

A freshwater aquatic invertebrate life-cycle test using the TGAI is not currently required for chloransulam-methyl.

v. Freshwater Field Studies

Not required for the proposed use of Chloransulam-methyl.

c. Toxicity to Estuarine and Marine Animals

i. Estuarine and Marine Fish, Acute

Acute toxicity testing with estuarine/marine fish using the TGAI is required for chloransulam-methyl because the end-use product is intended for direct application to the marine/estuarine environment or the active ingredient is expected to reach this environment because of its use in coastal counties. The preferred test species is sheepshead minnow. Results of these tests are tabulated below.

Estuarine/Marine Fish Acute Toxicity

Species/(Static or Flow-through)	% ai	96-hour LC50 (ppm) (measured)	Toxicity Category	MRID No. Author/Year	Study Classification
Silverside *(Menidia beryllina)*	97.4	>121	practically non-toxic	437189-01	Core

Since the LC50 falls in the range of >100 ppm, chloransulam-methyl is practically non-toxic to estuarine/marine fish on an acute basis. The guideline (72-3a) is fulfilled (MRID 437189-01).

ii. Estuarine and Marine Fish, Chronic

An estuarine/marine fish early life-stage toxicity test using the TGAI is not required for Chloransulam-methyl.

iii. Estuarine and Marine Invertebrates, Acute

Acute toxicity testing with estuarine/marine invertebrates using the TGAI is required for chloransulam-methyl because the end-use product is intended for direct application to the marine/estuarine environment or the active ingredient is expected to reach this environment because of its use in coastal counties. The preferred test species are mysid shrimp and eastern oyster. Results of these tests are tabulated below.

Estuarine/Marine Invertebrate Acute Toxicity

Species/Static or Flow-through	% ai.	96-hour LC50/EC50 (ppm) (measured)	Toxicity Category	MRID No. Author/Year	Study Classification
Eastern oyster (shell deposition or embryo-larvae) *(Crassostrea virginica)*	97.4	EC50 >111	practically non-toxic	437189-02	Core
Mysid *(Americamysis bahia)*	97.4	LC50 >121	practically non-toxic	437189-03	Core

Since the LC50/EC50 falls in the range of >100 ppm, Chloransulam-methyl is practically non-toxic to estuarine/marine invertebrates on an acute basis. The guideline (72-3b and 72-3c) is fulfilled (MRID 437189-03).

iv. Estuarine and Marine Invertebrate, Chronic

An estuarine/marine invertebrate life-cycle toxicity test using the TGAI is not required for Chloransulam-methyl.

v. Estuarine and Marine Field Studies

Not required for the proposed use of Chloransulam-methyl.

d. Toxicity to Plants

i. Terrestrial

Terrestrial plant testing (seedling emergence and vegetative vigor) is required for herbicides that have terrestrial non-residential outdoor use patterns and that may move off the application site through volatilization (vapor pressure $\geq 1.0 \times 10^{-5}$mm Hg at 25°C) or drift (aerial or irrigation) and/or that may have endangered or threatened plant species associated with the application site.

Currently, terrestrial plant testing is not required for pesticides other than herbicides except on a case-by-case basis (e.g., labeling bears phytotoxicity warnings incident data or literature that demonstrate phytotoxicity).

For seedling emergence and vegetative vigor testing the following plant species and groups should be tested: (1) six species of at least four dicotyledonous families, one species of which is soybean (*Glycine max*), and the second of which is a root crop, and (2) four species of at least two monocotyledonous families, one of which is corn (*Zea mays*).

Terrestrial Tier II studies are required for all low dose herbicides (those with the maximum use rate of 0.5 lbs ai/A or less) and any pesticide showing a negative response equal to or greater than 25% in Tier I tests. Terrestrial plant testing is required because the maximum use rate of Chloransulam-methyl is 0.040 lbs ai/A.

Tier II tests measure the response of plants, relative to a control, and five or more test concentrations. Results of Tier II toxicity testing on the technical/TEP material are tabulated below.

Nontarget Terrestrial Plant Seedling Emergence Toxicity (Tier II)

Species	% ai	EC25/EC05 (lbs ai/A) Endpoint Affected	MRID No. Author/Year	Study Classification
Monocot- Corn	98.2	0.040/phytotoxicity	437154-04	Core
Monocot- Ryegrass	98.2	0.0178/phytotoxicity	437154-04	Core
Monocot- Wheat	98.2	>0.046/all parameters similar	437154-04	Core
Monocot- Onion	98.2	0.0016/shoot length	437154-04	Core
Dicot- Carrot	98.2	0.0054/phytotoxicity	437154-04	Core
Dicot- Pinto bean	98.2	>0.046/all parameters similar	437154-04	Core
Dicot- Radish	98.2	0.0038/shoot fresh weight	437154-04	Core
Dicot- Soybean	98.2	0.046/shoot length	437154-04	Core
Dicot- Tomato	98.2	0.0076/shoot fresh weight	437154-04	Core
Dicot- Cotton	98.2	0.040/phytotoxicity	437154-04	Core

For Tier II seedling emergence Radish is the most sensitive dicot and Onion is the most sensitive monocot. The guideline (123-1) is fulfilled (MRID 437154-04).

Nontarget Terrestrial Plant Vegetative Vigor Toxicity (Tier II)

Species	% ai	EC25 (lbs ai/A) Endpoint Affected	MRID No. Author/Year	Study Classification
Monocot- Corn	98.2	0.0053/shoot fresh weight	437154-04	Core
Monocot- Onion	98.2	0.0122/phytotoxicity	437154-04	Core
Monocot- Ryegrass	98.2	0.0026/shoot fresh weight	437154-04	Core
Dicot- Cotton	98.2	0.0067/phytotoxicity	437154-04	Core
Dicot- Pinto bean	98.2	0.0098/shoot fresh weight	437154-04	Core
Dicot- Radish	98.2	0.00020/shoot fresh weight	437154-04	Core
Dicot- Soybean	98.2	0.023/shoot fresh weight	437154-04	Core
Dicot- Tomato	98.2	0.0006/shoot fresh weight	437154-04	Core

For Tier II vegetative vigor Radish is the most sensitive dicot and Ryegrass is the most sensitive monocot. The guideline (123-1) is fulfilled (MRID 437154-04).

ii. Aquatic Plants

Aquatic plant testing is required for any herbicide that has outdoor non-residential terrestrial uses that may move off-site by runoff (solubility >10 ppm in water), by drift (aerial or irrigation), or that is applied directly to aquatic use sites (except residential). The following species should be tested at Tier I: *Kirchneria subcapitata* and *Lemna gibba.* Aquatic plant testing was not required for Chloransulam-methyl.

Terrestrial Tier II studies are required for all low dose herbicides (those with the maximum use rate of 0.5 lbs ai/A or less) and any pesticide showing a negative response equal to or greater than 50% in Tier I tests. The following species should be tested at Tier II: *Kirchneria subcapitata*, *Lemna gibba*, *Skeletonema costatum*, *Anabaena flos-aquae*, and a freshwater diatom.

Results of Tier II toxicity testing on the technical/TEP material are tabulated below.

Nontarget Aquatic Plant Toxicity (Tier II)

Species	% ai	EC50/ EC05 (ppm)	MRID No. Author/Year	Study Classification
Vascular Plants				
Duckweed *Lemna gibba*	97.3	0.00312	436689-16 Milazzo/95	Core
Nonvascular Plants				
Green algae *Selenastrum capricornutum*	97.3	0.00346	436689-17	Core

The Tier II results indicate that green algae is the most sensitive nonvascular aquatic plant. The guideline (123-2) is fulfilled (MRID 436689-17).

3. Exposure and Risk Characterization

Risk characterization integrates the results of the exposure and ecotoxicity data to evaluate the likelihood of adverse ecological effects. The means of integrating the results of exposure and ecotoxicity data is called the quotient method. For this method, risk quotients (RQs) are calculated by dividing exposure estimates by ecotoxicity values, both acute and chronic.

RQ = EXPOSURE/TOXICITY

Rqs are then compared to OPP's levels of concern (LOCs). These LOCs are criteria used by OPP to indicate potential risk to nontarget organisms and the need to consider regulatory action. The criteria indicate that a pesticide used as directed has the potential to cause adverse effects on nontarget organisms. LOCs currently address the following risk presumption categories: (1) **acute high** - potential for acute risk is high regulatory action may be warranted in addition to restricted use classification (2) **acute restricted use** - the potential for acute risk is high, but this may be mitigated through restricted use classification (3) **acute endangered species** - the potential for acute risk to endangered species is high regulatory action may be warranted, and (4) **chronic risk** - the potential for chronic risk is high regulatory action may be warranted. Currently, EFED does not perform assessments for chronic risk to plants, acute or chronic risks to nontarget insects, or chronic risk from granular/bait formulations to mammalian or avian species.

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The ecotoxicity test values (i.e., measurement endpoints) used in the acute and chronic risk quotients are derived from the results of required studies. Examples of ecotoxicity values derived from the results of short-term laboratory studies that assess acute effects are: (1) LC50 (fish and birds) (2) LD50 (birds and mammals (3) EC50 (aquatic plants and aquatic invertebrates) and (4) EC25 (terrestrial plants). Examples of toxicity test effect levels derived from the results of long-term laboratory studies that assess chronic effects are: (1) LOEC (birds, fish, and aquatic invertebrates) (2) NOEC (birds, fish and aquatic invertebrates) and (3) MATC (fish and aquatic invertebrates). For birds and mammals, the NOEC value is used as the ecotoxicity test value in assessing chronic effects. Other values may be used when justified. Generally, the MATC (defined as the geometric mean of the NOEC and LOEC) is used as the ecotoxicity test value in assessing chronic effects to fish and aquatic invertebrates. However, the NOEC is used if the measurement end point is production of offspring or survival.

Risk presumptions, along with the corresponding RQs and LOCs are tabulated below.

Risk Presumptions for Terrestrial Animals

Risk Presumption	RQ	LOC
Birds		
Acute High Risk	EEC[1]/LC50 or LD50/sqft[2] or LD50/day[3]	0.5
Acute Restricted Use	EEC/LC50 or LD50/sqft or LD50/day (or LD50 < 50 mg/kg)	0.2
Acute Endangered Species	EEC/LC50 or LD50/sqft or LD50/day	0.1
Chronic Risk	EEC/NOEC	1
Wild Mammals		
Acute High Risk	EEC/LC50 or LD50/sqft or LD50/day	0.5
Acute Restricted Use	EEC/LC50 or LD50/sqft or LD50/day (or LD50 < 50 mg/kg)	0.2
Acute Endangered Species	EEC/LC50 or LD50/sqft or LD50/day	0.1
Chronic Risk	EEC/NOEC	1

[1] abbreviation for Estimated Environmental Concentration (ppm) on avian/mammalian food items

[2] $\frac{\text{mg/ft}^2}{\text{LD50} * \text{wt. of bird}}$ [3] $\frac{\text{mg of toxicant consumed/day}}{\text{LD50} * \text{wt. of bird}}$

Risk Presumptions for Aquatic Animals

Risk Presumption	RQ	LOC
Acute High Risk	EEC[1]/LC50 or EC50	0.5
Acute Restricted Use	EEC/LC50 or EC50	0.1
Acute Endangered Species	EEC/LC50 or EC50	0.05
Chronic Risk	EEC/MATC or NOEC	1

[1] EEC = (ppm or ppb) in water

Risk Presumptions for Plants

Risk Presumption	RQ	LOC
	Terrestrial and Semi-Aquatic Plants	
Acute High Risk	EEC[1]/EC25	1
Acute Endangered Species	EEC/EC05 or NOEC	1
	Aquatic Plants	
Acute High Risk	EEC[2]/EC50	1
Acute Endangered Species	EEC/EC05 or NOEC	1

[1] EEC = lbs ai/A
[2] EEC = (ppb/ppm) in water

a. Exposure and Risk to Nontarget Terrestrial Animals

For pesticides applied as a nongranular product (e.g., liquid, dust), the estimated environmental concentrations (EECs) on food items following product application are compared to LC50 values to assess risk. The predicted 0-day maximum and mean residues of a pesticide that may be expected to occur on selected avian or mammalian food items immediately following a direct single application at 1 lb ai/A are tabulated below.

Estimated Environmental Concentrations on Avian and Mammalian Food Items (ppm) Following a Single Application at 1 lb ai/A)

Food Items	EEC (ppm) Predicted Maximum Residue[1]	EEC (ppm) Predicted Mean Residue[1]
Short grass	240	85
Tall grass	110	36
Broadleaf/forage plants, and small insects	135	45
Fruits, pods, seeds, and large insects	15	7

[1] Predicted maximum and mean residues are for a 1 lb ai/a application rate and are based on Hoerger and Kenaga (1972) as modified by Fletcher *et al.* (1994).

Predicted residues (EECs) resulting from multiple applications are calculated in various ways. For the purpose of Chloransulam-methyl the following procedure was used:

i. Birds

The acute and chronic risk quotients for broadcast applications of nongranular products are tabulated below.

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Avian Acute and Chronic Risk Quotients for Single Application of Chloransulam methyl Based on a Bobwhite Quail LC50 of 2250 ppm and a Mallard Duck NOEC of 125 ppm.

Site/App. Method	App. Rate (lbs ai/A)	Food Items	Maximum EEC (ppm)	LC50 (ppm)	NOEC (ppm)	Acute RQ (EEC/ LC50)	Chronic RQ (EEC/ NOEC)
Soybean ground	0.040	Short grass	10	2250	125	0.00	0.08
		Tall grass	4	2250	125	0.00	0.03
		Broadleaf plants/Insects	5	2250	125	0.00	0.04
		Seeds	1	2250	125	0.00	0.01

The results indicate that for single broadcast applications of chloransulam methyl, no avian acute or chronic level of concern is exceeded at any registered application rate.

ii. Mammals

Based on the LD50 for laboratory rats of >5000 mg/kg and the low exposure levels, minimal acute risk to rats is expected.

iii. Insects

Currently, EFED does not assess risk to nontarget insects. Results of acceptable studies are used for recommending appropriate label precautions. Labeling for honey bees is not needed.

b. Exposure and Risk to Nontarget Freshwater Aquatic Animals

EFED calculates EECs using the GENeric Expected Environmental Concentration Program (GENEEC). The EECs are used for assessing acute and chronic risks to aquatic organisms. Acute risk assessments are performed using peak EEC values for single and multiple applications. Chronic risk assessments are performed using the 21-day EECs for invertebrates and 56-day EECs for fish.

The GENEEC program uses basic environmental fate data and pesticide label application information to estimate of the expected EECs following treatment of 10 hectares. The model calculates the concentration (i.e. EEC) of a pesticide in a one hectare, two meter deep pond, taking into account the following: (1) adsorption to soil or sediment (2) soil incorporation (3) degradation in soil before washoff to a water body and (4) degradation within the water body. The model also accounts for direct deposition of spray drift into the water body (assumed to be 1% and 5% of the application rate for ground and aerial applications, respectively). **(When multiple applications are permitted:** The interval between applications is included in the calculations. The environmental fate parameters used in the model for this pesticide are: soil

K_{OC}=34 L/kg, solubility=184 ppm, aerobic soil metabolism half-life=21 days, hydrolysis=231 days, water photolysis=0.02 days, aquatic metabolism=NA. EECs are tabulated below.

Estimated Environmental Concentrations (EECs) For Aquatic Exposure

Site	Application Method	Application Rate (lbs ai/A)	# of Apps./ Interval Between Apps.	Initial (PEAK) EEC (ppb)	21-day average EEC (ppb)	56-day average EEC (ppb)
GENEEC						
Soybean	ground incorporated	0.040	1	1.86	0.36	0.13

ii. Freshwater Fish, Invertebrates and Estuarine Organisms

Data indicate chloransulam methyl has low acute toxicity to fish and invertebrates. Coupling this with the Generic EECs shown above indicates minimal risk to fish and invertebrates.

d. Exposure and Risk to Nontarget Plants

i. Terrestrial and Semi-aquatic

Terrestrial and semi-aquatic plants may be exposed to pesticides from runoff, spray drift or volatilization. Semi-aquatic plants are those that inhabit low-lying wet areas that may be dry at certain times of the year. EFED's runoff scenario is: (1) based on a pesticide's water solubility and the amount of pesticide present on the soil surface and its top one inch (2) characterized as "sheet runoff" (one treated acre to an adjacent acre) for terrestrial plants (3) characterized as "channelized runoff" (10 treated acres to a distant low-lying acre) for semi-aquatic plants and (4) based on % runoff values of 0.01, 0.02, and 0.05 for water solubility of <10 ppm, 10-100 ppm, and >100 ppm, respectively.

Spray drift exposure from ground application is assumed to be 1% of the application rate. Spray drift from aerial, airblast, forced-air, and chemigation applications is assumed to be 5% of the application rate.

The following toxicity values will be used

Onion seedling emergence EC25=0.0016 lb ai/acre
Radish vegetative vigor EC25=0.0002 lb ai/acre

Chloransulam is assumed to be soluble such that it is assumed that up to 5% (0.05) of the applied could transport with surface water runoff.

Exposure due to sheet runoff from a treated area (1 acre) to an adjacent untreated area (1 acre) is calculated below:

0.04 lb ai/acre X 0.05 (runoff) = 0.002 lb ai/acre
0.002 lb ai/acre is divided by the seedling emergence EC25 of 0.0016 lb ai/acre
0.002 / 0.0016 = 1.25 (seedling emergence RQ for plants growing adjacent to a treated site.)

Exposure due to channelized runoff from a treated area (10 acres) to a nearby wetland area (1 acre) is calculated below:

0.04 lb ai/acre X 10 (acres) X 0.05 (runoff) = 0.02 lb ai/acre
0.02 lb ai/acre is divided by the seedling emergence EC25 of 0.0016 lb ai/acre
0.02 / 0.0016 = 12.5 (seedling emergence RQ for plants growing in wetlands receiving runoff from a treated site)

Exposure due to spray drift from aerial treatment is calculated below:

0.04 lb ai/acre X 0.05 (percent spray drift) = 0.002 lb ai/acre
0.002 lb ai/acre is divided by the vegetative vigor EC25 of 0.0002 ai/acre
0.002 / 0.0002 = 10 (vegetative vigor RQ for plants growing adjacent to a site treated aerially)

Exposure due to spray drift from ground treatment is calculated below:

0.04 lb ai/acre X 0.01 (percent spray drift from ground spray) = 0.0004 lb ai/acre
0.0004 lb ai/acre is divided by the vegetative vigor EC25 of 0.0002 lb ai/acre
0.0004 / 0.0002 = 2 (vegetative vigor RQ for plants adjacent to site treated by ground apray equipment)

Table showing risk quotients for terrestrial plants

	sheet runoff to adjacent area	channelized runoff to wetlands area	spray drift from aerial spray	spray drift from ground spray
onion seeding emergence	1.2	12.5	1.2	0.2
radish vegetative vigor	NA*	NA*	10	2

*Vegetative vigor study involves exposing plants by spraying foliage; surface water runoff is not expected to result in exposure to plant foliage.

If runoff and drift were to occur simultaneously, the risk from the combined exposure could be slightly greater than these numbers show. These risk quotients indicate a risk to plants from both spray drift and runoff. However, relatively speaking, these risk quotients are not exceptionally high compared to other herbicides. The risk from runoff would be reduced if chloransulam methyl is soil incorporated.

ii. Aquatic Plants

Exposure to nontarget aquatic plants may occur through runoff or spray drift from adjacent treated sites. An aquatic plant risk assessment is usually made for aquatic vascular plants using data from the surrogate, duckweed *(Lemna gibba)*. Non-vascular aquatic plant risk assessments are performed using either algae or a diatom species, whichever is most sensitive. An aquatic plant risk assessment for acute- endangered species is usually made for aquatic vascular plants from the surrogate duckweed *Lemna gibba*. To date there are no non-vascular plant species on the endangered species list. Runoff and drift exposure is computed from GENEEC. The risk quotient is determined by dividing the pesticide's initial or peak concentration in water by the plant EC50 value.

Acute risk quotients for vascular and non-vascular plants are tabulated below.

Acute Risk Quotients for Aquatic Plants based upon a duckweed (*Lemna gibba*) EC50 of 0.00312 and a nonvascular plant, green algae, EC50 of 0.00346.

Site/ Application Method/ Rate of Application in lbs ai/A (No. of Apps.)	Test Species	EC50 (ppm)	EEC (ppm)	RQ (EEC/ EC50)
Soybean Incorp. Ground 0.040 (1)	duckweed	0.00312	0.00186	0.60
	green algae	0.00346	0.00186	0.54

The results indicate that aquatic plants are at low risk from chlorahsulam methyl.

4. Endangered Species

Endangered species LOCs are exceeded for terrestrial plants.

The registrant should provide information on the proximity of endangered plants to areas where chloransulam methyl would be used. As an alternative, the registrant may participate in the Endangered Species Task Force that is gathering information on the locations of all endangered species relative to areas used for agriculture.

4. Labeling Requirements

a. Manufacturing-Use Products: No additional labeling required.

b. End-use Products: No additional labeling required.

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