

US EPA ARCHIVE DOCUMENT



**Reregistration Eligibility Decision (RED)
for MCPA (2-methyl-4-chlorophenoxyacetic acid)
List A Case 0017**

September 30, 2004



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

CERTIFIED MAIL

Dear Registrant:

This is to inform you that the Environmental Protection Agency (hereafter referred to as EPA or the Agency) has completed its review of the available data and public comments received related to the preliminary risk assessment for the herbicide MCPA (2-methyl-4-chlorophenoxyacetic acid). The Agency has revised the human health and environmental effects risk assessments based on the comments received during the public comment period and additional data from the registrant. Based on the Agency's revised risk assessments for MCPA, EPA has identified risk mitigation measures that the Agency believes are necessary to address the human health and environmental risks associated with the current use of MCPA. EPA is now publishing its reregistration eligibility, risk management, and tolerance reassessment decisions for the current uses of MCPA, and its associated human health and environmental risks. The Agency's decision on the individual chemical MCPA can be found in the attached document entitled, "Reregistration Eligibility Decision for MCPA (2-methyl-4-chlorophenoxyacetic acid)" which was signed on September 30, 2004.

A Notice of Availability for the Reregistration Eligibility Decision for MCPA is being published in the *Federal Register*. To obtain copies of the RED document, please contact the Pesticide Docket, Public Response and Program Resources Branch, Field and External Affairs Division (7506C), Office of Pesticide Programs (OPP), USEPA, Washington, DC 20460, telephone (703) 305-5805. Electronic copies of the RED and all supporting documents are available on the Internet. See www.epa.gov/pesticides/reregistration/status.htm.

As part of the Agency's effort to involve the public in the implementation of the Food Quality Protection Act of 1996 (FQPA), EPA is undertaking a special effort to maintain open public dockets and to engage the public in the reregistration and tolerance reassessment processes. During the public comment period, comments on the risk assessments were submitted by the MCPA Task Force Three, representing the technical registrants and other registrants of end-use products. EPA also received comments from a grower group, attesting to the importance of MCPA as an herbicide, and from the California Regional Water Quality Control Board, commenting that EPA should establish water quality criteria for MCPA and conduct a cumulative assessment of the ecological effects of phenoxy herbicides. A close-out conference call with interested stakeholders and the United States Department of Agriculture was held on September 29, 2004, to discuss the risk management decisions and resulting label changes.

Please note that the MCPA risk assessments and the attached RED concern only this particular pesticide and

its metabolites. The Food Quality Protection Act (FQPA) requires that, when considering whether to establish, modify, or revoke a tolerance, the Agency consider “available information” concerning the cumulative effects of a particular pesticide’s residues and “other substances that have a common mechanism of toxicity.” Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to MCPA and any other substances, and MCPA does not appear to produce a toxic metabolite produced by other substances. For the purposes of this tolerance action, therefore, EPA has not assumed that MCPA has a common mechanism of toxicity with other substances. For information regarding EPA’s efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the policy statements released by EPA’s Office of Pesticide Programs concerning common mechanism determinations and procedures for cumulating effects from substances found to have a common mechanism on EPA’s website at <http://www.epa.gov/pesticides/cumulative/>.

This document contains generic and product-specific Data Call-In(s) (DCIs) that outline further data requirements for this chemical. Note that registrants of MCPA must respond to DCIs issued by the Agency within 90 days of receipt of this letter. This RED also contains labeling requirements for MCPA products. End-use product labels must be revised by the manufacturer to adopt the changes set forth in Section IV of this document. Instructions for registrants on submitting revised labeling and the time frame established to do so can be found in Section V of this document.

Should a registrant fail to implement any of the risk mitigation measures outlined in this document, the Agency will continue to have concerns about the risks posed by MCPA. Where the Agency has identified any unreasonable adverse effect to human health and the environment, the Agency may at any time initiate appropriate regulatory action to address this concern. At that time, any affected person(s) may challenge the Agency’s action.

There will be a 60-day public comment period for this document, commencing on the day the Notice of Availability publishes in the Federal Register.

If you have questions on this document or the proposed label changes, please contact the Special Review and Reregistration Division representative, Kelly White at (703) 305-8401 or white.kelly@epa.gov. For questions about product reregistration and/or the Product DCI that accompanies this document, please contact Bonnie Adler at (703) 308-8523 or adler.bonnie@epa.gov.

Debra Edwards, Ph.D.
Director, Special Review and Reregistration Division
Office of Pesticide Programs

Attachment

Reregistration Eligibility Decision

for

MCPA

List A

Case 0017

Approved By:

/s/

Debra Edwards, Ph.D.

**Director, Special Review and
Reregistration Division**

September 30, 2004

Date

Table of Contents

MCPA Reregistration Eligibility Decision Team	i
Glossary of Terms and Abbreviations	ii
Executive Summary	iv
I. Introduction	1
II. Chemical Overview	2
A. Regulatory History	2
B. Chemical Identification	3
C. Use Profile	4
D. Estimated Usage of Pesticide	5
III. Summary of MCPA Risk Assessment	6
A. Human Health Risk Assessment	7
1. Dietary Risk from Food	7
a. Toxicity	7
b. FQPA Safety Factor	9
c. Population Adjusted Dose (PAD)	10
d. Exposure Assumptions	11
e. Food Risk Characterization	11
2. Dietary Risk from Drinking Water	11
a. Surface Water	12
b. Ground Water	13
c. Drinking Water Levels of Comparison (DWLOCs)	13
3. Residential Exposure and Risk	15
a. Toxicity	15
b. Residential Handler Risk	16
(1) Exposure Scenarios, Data, & Assumptions	16
(2) Residential Handler Risk Estimates and Risk Characterization	17
d. Residential Postapplication Risk	18
(1) Exposure Scenarios, Data, & Assumptions	18
(2) Residential Postapplication Risk Estimates and Risk Characterization	20
3. Aggregate Risk	21
a. Acute Aggregate Risk Estimates and Risk Characterization	22
b. Short-term Aggregate Risk Estimates and Risk Characterization	23
c. Chronic Aggregate Risk Estimates and Risk Characterization	

	23
4.	Cumulative Risk	23
5.	Occupational Risk	24
a.	Toxicity	24
b.	Occupational Handler Exposure	25
c.	Occupational Handler Risk	27
d.	Postapplication Occupational Risk	29
(1)	Data Sources, Assumptions, and Transfer Coefficients	30
(2)	Occupational Postapplication Risk Estimates and Risk Characterization	32
e.	Human Incident Data	32
B.	Environmental Risk Assessment	33
1.	Environmental Fate and Transport	33
2.	Water Resource Assessment	33
a.	Ground Water	33
b.	Surface Water	34
3.	Toxicity (Hazard) Assessment	35
a.	Avian, Mammalian, and Non-target Insect Toxicity	35
	Toxicity to Mammals	36
b.	Toxicity to Aquatic Animals	37
c.	Toxicity to Plants	38
4.	Exposure and Risk Calculations	40
a.	Levels of Concern	40
b.	Exposure and Risk to Nontarget Terrestrial Animals	40
(1)	Exposure to Birds and Mammals	40
(2)	Avian Risk	41
(3)	Risk to Mammals	42
(4)	Risk to Insects	44
5.	Exposure and Risk to Nontarget Aquatic Animals	44
a.	Exposure and Risk to Nontarget Plants	44
(1)	Risk to Terrestrial Plants	44
(2)	Risk to Aquatic Plants	45
6.	Ecological Incidents	46
7.	Endangered Species	47
8.	Risk Characterization	47
a.	Terrestrial Animal Risk Characterization	47
b.	Aquatic Organism Risk Characterization	48
c.	Terrestrial and Aquatic Plant Risk Characterization	49
IV.	Risk Management, Reregistration and Tolerance Reassessment	50
A.	Determination of Reregistration Eligibility	50
B.	Public Comments and Responses	51

C.	Regulatory Position	52
1.	FQPA Assessment	52
a.	“Risk Cup” Determination	52
b.	Determination of Safety for U.S. Population	52
c.	Determination of Safety for Infants and Children	52
d.	Endocrine Disruptor Effects	55
e.	Cumulative Risks	55
f.	Tolerance Summary	55
	(1) Codex/International Harmonization	58
2.	Labels	59
3.	Mitigation for Agricultural Uses	59
a.	Use Cancellations	59
b.	Application Rate Reductions	59
D.	Regulatory Rationale	60
1.	Human Health Risk Management	61
a.	Dietary (Food) Risk Mitigation	61
b.	Drinking Water Risk Mitigation	61
c.	Residential Risk Mitigation	61
	(1) Residential Handler Mitigation	61
	(2) Residential Postapplication Mitigation	62
d.	Aggregate Risk Mitigation	63
	(1) Short-term Aggregate Risk	63
	(2) Chronic Aggregate Risk	64
e.	Occupational Risk Mitigation	64
	(1) Handler Risk Mitigation	64
	(2) Post-application Risk Mitigation	66
2.	Environmental Risk Mitigation	67
3.	Other Labeling Requirements	67
a.	Endangered Species Statement	67
b.	Spray Drift Management	68
V.	What Registrants Need to Do	68
A.	Manufacturing Use Products	70
1.	Additional Data Requirements	70
2.	Labeling for Manufacturing Use Products	71
B.	End-Use Products	71
1.	Additional Product-Specific Data Requirements	71
2.	Labeling for End-Use Products	72
C.	Labeling Changes Summary Table	72

MCPA Reregistration Eligibility Decision Team

Office of Pesticide Programs:

Biological and Economic Analysis Assessment

Jihad Alsadek
Steve Jarboe

Environmental Fate and Effects Risk Assessment

Mark Corbin
Christine Hartless
Sidney Abel

Health Effects Risk Assessment

Byong-Han Chin
Timothy Dole
Felecia Fort
Michael Metzger
Whang Phang

Risk Management

Kelly White, Chemical Review Manager
Thomas Brennan
Demson Fuller
Nathan Mottl

Glossary of Terms and Abbreviations

AGDCI	Agricultural Data Call-In
ae	Acid Equivalent
ai	Active Ingredient
aPAD	Acute Population Adjusted Dose
AR	Anticipated Residue
BCF	Bioconcentration Factor
CFR	Code of Federal Regulations
cPAD	Chronic Population Adjusted Dose
CSF	Confidential Statement of Formula
CSFII	USDA Continuing Surveys for Food Intake by Individuals
DCI	Data Call-In
DEEM	Dietary Exposure Evaluation Model
DFR	Dislodgeable Foliar Residue
DWLOC	Drinking Water Level of Comparison.
EC	Emulsifiable Concentrate Formulation
EEC	Estimated Environmental Concentration
EPA	Environmental Protection Agency
EUP	End-Use Product
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FFDCA	Federal Food, Drug, and Cosmetic Act
FQPA	Food Quality Protection Act
FOB	Functional Observation Battery
G	Granular Formulation
GENEEC	Tier I Surface Water Computer Model
GLN	Guideline Number
HAFT	Highest Average Field Trial
IR	Index Reservoir
LC ₅₀	Median Lethal Concentration. A statistically derived concentration of a substance that can be expected to cause death in 50% of test animals. It is usually expressed as the weight of substance per weight or volume of water, air or feed, e.g., mg/l, mg/kg or ppm.
LD ₅₀	Median Lethal Dose. A statistically derived single dose that can be expected to cause death in 50% of the test animals when administered by the route indicated (oral, dermal, inhalation). It is expressed as a weight of substance per unit weight of animal, e.g., mg/kg.
LOC	Level of Concern
LOD	Limit of Detection
LOAEL	Lowest Observed Adverse Effect Level
MATC	Maximum Acceptable Toxicant Concentration
µg/g	Micrograms Per Gram
µg/L	Micrograms Per Liter
mg/kg/day	Milligram Per Kilogram Per Day
mg/L	Milligrams Per Liter
MOE	Margin of Exposure
MRID	Master Record Identification (number). EPA's system of recording and tracking studies submitted.
MUP	Manufacturing-Use Product
NA	Not Applicable
NAWQA	USGS National Water Quality Assessment
NPDES	National Pollutant Discharge Elimination System
NR	Not Required

NOAEL	No Observed Adverse Effect Level
OP	Organophosphate
OPP	EPA Office of Pesticide Programs
OPPTS	EPA Office of Prevention, Pesticides and Toxic Substances
PAD	Population Adjusted Dose
PCA	Percent Crop Area
PDP	USDA Pesticide Data Program
PHED	Pesticide Handler's Exposure Data
PHI	Preharvest Interval
ppb	Parts Per Billion
PPE	Personal Protective Equipment
ppm	Parts Per Million
PRZM/EXAMS	Tier II Surface Water Computer Model
Q ₁ *	The Carcinogenic Potential of a Compound, Quantified by the EPA's Cancer Risk Model
RAC	Raw Agriculture Commodity
RED	Reregistration Eligibility Decision
REI	Restricted Entry Interval
RfD	Reference Dose
RQ	Risk Quotient
SCI-GROW	Tier I Ground Water Computer Model
SAP	Science Advisory Panel
SF	Safety Factor
SLC	Single Layer Clothing
SLN	Special Local Need (Registrations Under Section 24(c)) of FIFRA)
TGAI	Technical Grade Active Ingredient
TRR	Total Radioactive Residue
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UF	Uncertainty Factor
UV	Ultraviolet
WPS	Worker Protection Standard

Executive Summary

EPA has completed its review of public comments on the preliminary risk assessments and is issuing its risk management decision for MCPA. The revised risk assessments are based on review of the required target data base supporting the use patterns of the currently registered products and additional information received from the MCPA Task Force Three. After considering the risks identified in the revised risk assessment and comments and mitigation suggestions from interested parties, EPA developed its risk management decision for uses of MCPA that pose risks of concern. The decision is discussed fully in this document.

MCPA is an herbicide in the phenoxy or phenoxyacetic acid family that is used post-emergence for selective control of broadleaf weeds. MCPA is registered for use on alfalfa, barley, clover, flax, lespedeza, oats, pasture and rangeland grass, peas, rice, rye, sorghum, trefoil, triticale, and wheat, as well as grass grown for seed, to control a wide spectrum of broadleaf weeds. MCPA is also registered for use on turf, lawns, vines, rights-of-way, and forestry applications. Residential homeowners may use MCPA on lawns.

Approximately 4.6 million pounds of MCPA active ingredient are applied annually to approximately 12 million acres (this figure includes both agricultural and non-agricultural use). Approximately 1.2 millions pounds of active ingredient are used annually on residential and commercial turf. Most of the agricultural use is allocated to spring wheat (56%), winter wheat (17%), barley (17%), and oats/rye (4%). The remaining usage is primarily on seed crops, pasture, hay, lots/farmsteads, dry beans/peas, and flax. Crops with a high percentage of the total U.S. planted acres treated include spring wheat (33%), barley (28%), flax (23%), summer fallow (9%), oats/rye (8%), and green beans/peas (4%). Most of the usage is in Michigan, California, Oregon, Idaho, North Carolina, Florida, Ohio, New York, Texas, Minnesota, North Dakota, and Washington.

There are four active ingredients associated with MCPA: MCPA acid, MCPA sodium salt, MCPA dimethylamine salt (MCPA DMAS), and MCPA 2-ethylhexyl ester (MCPA 2-EHE). Formulation types registered include solids, soluble concentrate/solid, water dispersible granules (dry flowable), and wettable powder. MCPA is usually applied in combination with other phenoxy class chemicals, such as 2,4-D, 2,4-DB, MCPP-p, and MCPB. MCPA can be applied anytime, but is recommended for best efficacy in early spring and early fall.

The Food Quality Protection Act (FQPA) requires that, when considering whether to establish, modify, or revoke a tolerance, the Agency consider “available information” concerning the cumulative effects of a particular pesticide’s residues and “other substances that have a common mechanism of toxicity.” Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to MCPA and any other substances, and MCPA does not appear to produce a toxic metabolite produced by other substances. For the purposes of this tolerance action, therefore, EPA has not assumed that MCPA has a common mechanism of toxicity with other substances. For information regarding EPA’s efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the policy statements

released by EPA's Office of Pesticide Programs concerning common mechanism determinations and procedures for cumulating effects from substances found to have a common mechanism on EPA's website at <http://www.epa.gov/pesticides/cumulative/>.

Dietary Risk

Acute and chronic dietary exposures for food and drinking water do not exceed the Agency's level of concern; therefore, no mitigation is warranted at this time for any dietary exposure to MCPA.

Residential Risk

Acute residential risks posed by the use of MCPA are of concern to the Agency. However, EPA believes that those risks can be reduced to acceptable levels with implementation of the application rate reductions being required through this RED. In addition, the registrants have agreed to conduct a hand-press study as a condition of reregistration, which should allow the Agency to further characterize the potential for residential risks.

Short-term residential risks are currently not of concern to the Agency.

Aggregate Risk

Short-term and chronic aggregate risk posed by the use of MCPA is not of concern to the Agency. No mitigation is required.

Occupational Risk

Occupational exposure to MCPA is of concern to the Agency. However, EPA believes that those risks can be reduced to acceptable levels with the implementation of the following mitigation measures: (1) requiring application rate reductions; and (2) cancelling use on rice and grain sorghum.

Ecological Risk

Ecological risks are of concern to the Agency. The mitigation measures of (1) reducing maximum application rates, (2) cancelling use on rice and grain sorghum, and (3) specifying a required spray droplet size of "medium to coarse" (i.e., prohibiting "fine" sprays) are expected to lessen, but not eliminate, the risk of MCPA to wildlife and plants.

Conclusions

The Agency is issuing this Reregistration Eligibility Document (RED) for MCPA, as announced in a Notice of Availability published in the *Federal Register*. This RED document includes guidance and time frames for complying with any required label changes for products containing MCPA. With the addition of the label restrictions and amendments detailed in this document, the Agency has determined that all currently registered uses of MCPA are eligible for reregistration with the exception of rice. In addition, the registrant has agreed to cancel use on grain sorghum.

The risk assessments for MCPA are based on the best scientific data currently available to the Agency and are adequate for regulatory decision making. There is a 60-day public comment period for this document.

I. Introduction

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) was amended in 1988 to accelerate the reregistration of products with active ingredients registered prior to November 1, 1984. The amended Act calls for the development and submission of data to support the reregistration of an active ingredient, as well as a review of all submitted data by the U.S. Environmental Protection Agency (referred to as EPA or "the Agency"). Reregistration involves a thorough review of the scientific database underlying a pesticide's registration. The purpose of the Agency's review is to reassess the potential hazards arising from the currently registered uses of the pesticide; to determine the need for additional data on health and environmental effects; and to determine whether or not the pesticide meets the "no unreasonable adverse effects" criteria of FIFRA.

On August 3, 1996, the Food Quality Protection Act of 1996 (FQPA) was signed into law. This Act amends FIFRA to require tolerance reassessment during reregistration. It also requires that by 2006, EPA must review all tolerances in effect on the day before the date of the enactment of the FQPA, which was August 3, 1996. FQPA also amends the FFDCA to require a safety finding in tolerance reassessment based on factors including an assessment of cumulative effects of chemicals with a common mechanism of toxicity.

Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to MCPA and any other substances, and MCPA does not appear to produce a toxic metabolite produced by other substances. For the purposes of this tolerance action, therefore, EPA has not assumed that MCPA has a common mechanism of toxicity with other substances. For information regarding EPA's efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the policy statements released by EPA's Office of Pesticide Programs concerning common mechanism determinations and procedures for cumulating effects from substances found to have a common mechanism on EPA's website at <http://www.epa.gov/pesticides/cumulative/>.

This document consists of six sections. Section I contains the regulatory framework for reregistration/tolerance reassessment. Section II provides a profile of the use and usage of the chemical. Section III gives an overview of the revised human health and environmental effects risk assessments resulting from public comments and other information. Section IV presents the Agency's reregistration eligibility and risk management decisions. Section V summarizes required label changes based on the risk mitigation measures outlined in Section IV. Section VI provides information on how to access related documents. Finally, the Appendices list Data Call-In (DCI) information. The revised risk assessments and related addenda are not included in this document, but are available on the Agency's web page www.epa.gov/pesticides, and in the Public Docket.

II. Chemical Overview

A. Regulatory History

MCPA was first registered in the United States in 1973. In the early 1980s, EPA conducted a thorough review of the scientific data base on MCPA and reassessed the Agency's earlier regulatory position. A Registration Standard for MCPA was issued in July 10, 1981, and an MCPA Guidance Document was issued in March 1982. In June 1988, EPA issued the MCPA Final Registration Standard and Tolerance Reassessment (FRSTR).

This Reregistration Eligibility Decision (RED) reflects a reassessment of all data to date. The RED evaluates risks from all currently registered uses, including wheat, barley, oats, rye, residential turf, sod farms, golf courses, pasture-rangeland, and non-cropland rights-of-way. The document also presents EPA's evaluation of MCPA use on peas and flax, which is supported by the U.S. Department of Agriculture's (USDA's) Interregional Research Project #4 (IR-4).

In an effort to promote transparency of the reregistration process and include the public in developing regulatory decisions, EPA has developed a public participation process that is used for pesticide tolerance reassessment and reregistration. This public participation process was developed in partnership with USDA, based on EPA's and USDA's experiences with the pilot public participation process used for the organophosphate pesticides, comments received from the Tolerance Reassessment Advisory Committee and the public during the public comment period on the proposed process, and EPA's experience with the interim process used in developing decisions for a number of non-organophosphate pesticides during the past few years. The public participation process encompasses full and modified versions that enable EPA to tailor the level of review to the level of refinement of the risk assessments, as well as to the amount of use, risk, public concern, and complexity associated with each pesticide.

EPA followed a 4-phase, modified public participation process for MCPA. Consistent with this process, EPA initiated Phase 1 of the process by transmitting the human health and ecological risk assessments to the technical registrants for a 30-day error-correction review (Phase 1 opened on March 29, 2004). In Phase 2, EPA considered the errors that were identified by the registrants and made changes in the risk assessments as appropriate. To initiate Phase 3 of the process, EPA published a Federal Register notice announcing the availability of the revised risk assessments and supporting documents for a 60-day public review and comment period (Phase 3 opened on June 23, 2004). EPA received only 3 comments during the comment period, none of which were specific to the risk assessment or potential risk mitigation measures.

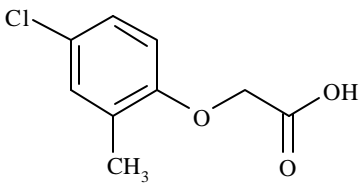
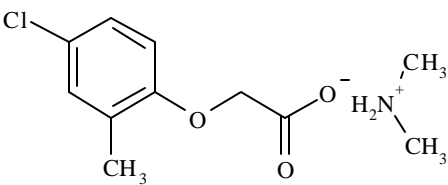
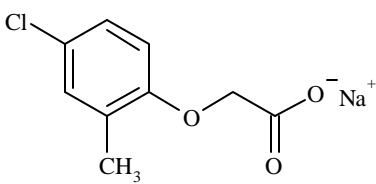
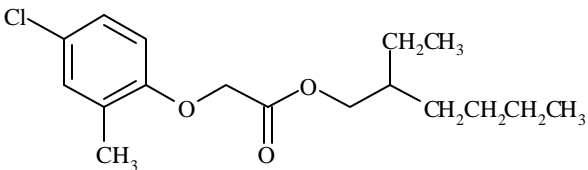
A risk mitigation meeting was held with the MCPA Task Force Three and USDA on August 17, 2004. Following that meeting, the MCPA Task Force Three provided new information regarding use rates, acreage, application frequency, etc., which enabled EPA to significantly refine some of the risk assessments. A close-out conference call was conducted on September 29, 2004, to discuss the risk management decisions and resulting changes to the MCPA labels.

B. Chemical Identification

MCPA is an herbicide in the phenoxy or phenoxyacetic acid family. The basic manufacturers are Nufarm UK Limited, A.H. Marks & Co. Ltd., and Dow Agrosiences LLC. The following four forms of MCPA are registered in the United States: acid, dimethylamine salt (DMAS), sodium salt, and 2-ethylhexyl ester (2-EHE).

The chemical names, structures, empirical formula, molecular weight, CAS registry numbers, and PC Codes of the registered MCPA forms are depicted in Figure A.

Figure A: Chemical structures of MCPA Forms

	<u>MCPA acid</u> Empirical Formula: C ₉ H ₉ ClO ₃ Molecular weight: 200.6 CAS Registry No.: 94-74-6 PC Code: 030501
	<u>MCPA dimethylamine salt (DMAS)</u> Empirical Formula: C ₁₁ H ₁₆ ClNO ₃ Molecular weight: 245.7 CAS Registry No.: 2039-46-5 PC Code: 030516
	<u>MCPA sodium salt (Na)</u> Empirical Formula: C ₉ H ₈ ClNaO ₃ Molecular weight: 222.6 CAS Registry No.: 3653-48-3 PC Code: 030502
	<u>MCPA 2-ethylhexyl ester (2-EHE)</u> Empirical Formula: C ₁₇ H ₂₅ ClO ₃ Molecular weight: 312.5 CAS Registry No.: 29450-45-1 PC Code: 030564

MCPA acid is a white to light brown solid, flake, or microcrystalline powder with a melting point of 114-119 C, density of 1.18-1.21 g/ml at 20°C, octanol/water partition coefficient (log K_{OW}) of 2.73, and vapor pressure of 7.7 x 10⁻⁶ mbar at 20°C. MCPA is practically insoluble in water (0.03 g/100 g at 20°C) and is soluble in a range of organic solvents including acetone (91.8 g/100 g), ethyl ether (50.2 g/100 g), chloroform (5.5 g/100 g), and benzene (3.3 g/100 g).

MCPA DMAS is a pale yellow or yellowish-white liquid with a boiling point of 111°C, density of 1.181 at 20°C, and octanol/water partition coefficient (log K_{OW}) of 1.415 at 25°C. MCPA DMAS rapidly dissociates in an aqueous medium to form the free phenoxy acid moiety and the dimethyl ammonium ion.

MCPA 2-EHE is an amber to brown liquid with a boiling point of 260-265°C, bulk density of 8.9 lb/gal (1.06 g/mL specific gravity), octanol/water partition coefficient (P_{OW}) of 4.29×10^{-6} , and vapor pressure of 1.77×10^{-5} mbar at 20°C. MCPA 2-EHE is slightly soluble in water (0.1%, w:w) and is miscible with most organic solvents and in mineral oils.

Less chemical identification information is available concerning the MCPA sodium salt as compared to the other three MCPA formulations. MCPA sodium salt is water soluble and under acidic conditions it reverts to the acid form (see the MCPA acid chemical identification information, above).

C. Use Profile

The following is information on the currently registered uses including an overview of use sites and application methods. A detailed table of the uses of MCPA eligible for reregistration is contained in Appendix A.

Type of Pesticide

MCPA is an herbicide in the phenoxy or phenoxyacetic acid family that is used postemergence for selective control of broadleaf weeds. Phenoxy herbicides act by simulating the action of natural hormones and produce uncoordinated plant growth. MCPA disrupts both seedling emergence and vegetative vigor, and can be used to control both dicots and monocots.

Use Sites

MCPA is registered for use on alfalfa, barley, clover, flax, lespedeza, oats, grass, peas, rice, rye, sorghum, trefoil, triticale, and wheat, as well as grass grown for seed, to control a wide spectrum of broadleaf weeds. MCPA is also registered for use on residential lawns, sod farm turf, golf courses, rights-of-way, pasture, and rangeland.

MCPA is usually applied in combination with other phenoxy class chemicals, including 2,4-D, 2,4-DB, MCPP, and MCPB. It can be applied anytime, but is recommended for best efficacy in early spring and early fall. The maximum application rate that was assessed in the RED is 4 lb ai/A. The maximum application rate that is eligible for reregistration is 3 lb ai/A.

Target Pests

MCPA is labeled for control of a wide variety of weeds.

Formulation Types

Formulations include granulars, emulsifiable concentrates, soluble concentrate/liquids and wettable powders.

Method and Rates of Application

MCPA may be applied using aircraft, groundboom sprayers, broadcast spreaders, hand-held sprayers, and hose-end sprayers. Ground applications are made whenever possible due to lower cost and convenience, while aerial applications are made to rangeland areas where woody weeds are too tall for a tractor.

Typically one application is made per growing season. The recommended application window for small grains is the four leaf stage up to the boot stage. Applications are not recommended in the boot to dough stage. Application rates range from 0.25 to 4.0 lb acid equivalent per acre (ae/acre). The maximum application rate for wheat, the largest use of MCPA, is 1.5 lb ae/acre.

Timing of Application

Typically one application is made per growing season, although two applications per year are permitted for certain crops or application sites.

D. Estimated Usage of Pesticide

Approximately 4.6 million pounds of MCPA active ingredient are applied annually to approximately 12 million acres (this figure includes both agricultural and non-agricultural use). Most of the acreage is treated with one pound a.i. or less per application and one pound a.i. or less per year. Approximately 1.2 million pounds of active ingredient are used annually on residential and commercial turf. Largest markets in terms of total pounds active ingredient include wheat, barley, turf, pasture, oats, rice, seed crops, flax, dry peas, green peas, and rye. Data presented by the MCPA Task Force at the 2001 SMART Meeting indicates that crops with a high percentage treated of total U.S. planted acres include flax (36%), barley (33%), wheat (27%), rice (22%), seed crops (21%), dry peas (16%), green peas (14%), and oats (14%). Most of the usage is in Michigan, California, Oregon, Idaho, North Carolina, Florida, Ohio, New York, Texas, Minnesota, and North Dakota. Table 1 below summarizes the best available estimates for the pesticide usage of MCPA.

Table 1: MCPA Crop Usage Summary

Site	Acres Grown (000)	Acres Treated (000)		% of Crop Treated		LB AI Applied (000)		Average Application Rate			States of Most Usage	
		Wtd Avg	Est Max	Wtd Avg	Est Max	Wtd Avg	Est Max	lb ai/ acre/yr	# appl/yr	lb ai/ A/appl	(% of total lb ai used on this site)	
Alfalfa	23,701	8	23	0.03%	0.10%	3.1	10.0	0.41	1.22	0.34	WA WY MT ID PA 80%	
Barley	7,326	2050	2,781	28.0%	38%	760.0	1,020.3	0.37	1.06	0.35	ND MN WA ID 82%	
Beans/Peas, Green	709	30	67	4.2%	9%	8.6	15.8	0.29	1.00	0.29	WA OR WI UT 81%	
Flax	175	40	76	22.9%	43%	13.6	29.8	0.34	1.01	0.33	ND SC MN 81%	
Golf course turf	-	31	60	-	-	28.0	58.0	-	-	-		
Hay, Other	33,881	25	43	0.1%	0.13%	16.6	34.2	0.65	1.19	0.55	CA WA OR MT NC ND 83%	
Idle Cropland	7,275	15	30	0.2%	0.41%	13.3	26.3	0.88	1.00	0.88	SD 81%	
Lawns and Turf	-	0.5	1.0	-	-	-	-	-	-	-		
Lots/Farmsteads/etc	24,232	8	20	0.03%	0.08%	6.1	14.1	0.77	1.24	0.62	ND KS UT OR WA CA 66%	
Oats/Rye	6,184	500	794	8.1%	13%	190.0	313.5	0.38	1.03	0.37	ND SD MN PA WI ME 75%	
Pasture	75,719	47	230	0.1%	0.30%	18.4	108.0	0.39	1.00	0.39	MN MO 80%	
Rice	2,992	110	234	3.7%	8%	73.3	169.7	0.67	1.04	0.64	CA AR 86%	
Seed Crops	1,516	140	280	9.2%	18%	59.9	119.7	0.43	1.00	0.43	OR WA 86%	
Setaside Acres	20,521	27	53	0.1%	0.26%	12.8	25.5	0.48	1.02	0.47	ND WA MN OR 86%	
Sod	152	2	4	1.0%	3%	1.6	4.0	1.00	1.00	1.00	MN 100%	
Sorghum	11,140	4	18	0.03%	0.16%	3.1	16.0	0.82	1.00	0.82	KS 80%	
Summer Fallow	28,567	76	153	0.3%	1%	16.6	48.0	0.22	1.05	0.21	ND SD WA OR ID 84%	
Wheat, Spring	21,311	7020	9,327	32.9%	44%	2,550.0	3,386.7	0.36	1.10	0.33	ND MN SD 88%	
Wheat, Winter	44,907	2080	3,060	4.6%	7%	770.0	1,146.1	0.37	1.00	0.37	WA ID OR KS MT SD 79%	
Woodland	62,089	2	6	0.003%	0.01%	0.4	1.9	0.22	1.08	0.20	ID 95%	
Total		12,337	14,965			4,606	5,667					

COLUMN HEADINGS

Wtd. Avg. = Weighted average--the most recent years and more reliable data are weighted more heavily.

Est. Max. = Estimated maximum, which is estimated from available data.

Average application rates are calculated from the weighted averages.

NOTES ON TABLE DATA

Usage data primarily covers 1991 - 2000. SOURCES: EPA, USDA , and National Center for Food and Agricultural Policy.

III. Summary of MCPA Risk Assessment

The following is a summary of EPA's human health and ecological risk findings and conclusions for the herbicide, MCPA, as presented fully in the following supporting risk assessment documents:

MCPA Revised Human Health Risk Assessment for the Reregistration Eligibility Decision (RED) Document, dated June 4, 2004;
MCPA Revised Human Health Risk Assessment for the Reregistration Eligibility Decision (RED) Document, dated September 14, 2004; and

The purpose of this RED document is to summarize the key features and findings of the risk assessment in order to help the reader better understand the risk management decisions reached by the Agency. While the risk assessments and related addenda are not included in this document, they are available in the public docket.

A. Human Health Risk Assessment

Risks from dietary exposure (food and drinking water), residential exposure, aggregate exposures, and occupational exposures have been evaluated for MCPA. MCPA has been classified as a “not likely” carcinogen; therefore, no carcinogenic analysis was conducted.

1. Dietary Risk from Food

a. Toxicity

The Agency has reviewed all toxicity studies submitted and has determined that the toxicity database supports a reregistration eligibility determination for all currently supported uses. Further details on the toxicity of MCPA can be found in the June 4, 2004, Revised Human Health Risk Assessment.

Tables 2-5, below, present a summary of the available acute toxicity data on MCPA acid, MPCA DMAS, MCPA 2-EHE, and MCPA sodium salt. The available data indicate that acute oral, dermal, inhalation, and primary dermal irritation toxicity of MCPA are generally of low acute toxicity (Category III to IV). In primary eye irritation studies, only MCPA 2-EHE was found to be of low toxicity (Category IV). MCPA, MCPA DMAS, and MCPA sodium salt are considered to be strong to severe eye irritants (toxicity category I). Dermal sensitization potential studies showed that only MCPA 2-EHE was a dermal sensitizer. NOTE: The technical acute toxicity values included in this document are for informational purposes only. The data supporting these values may or may not meet the current acceptance criteria.

Table 2: MCPA Acid Acute Toxicity

Study Type	MRID No.	RESULTS	Toxicity Category
Acute Oral (Rat)	00021972	LD ₅₀ = 765 mg/kg	III
Acute Dermal (Rabbit)	250090	LD ₅₀ > 2000 mg/kg	III
Acute Inhalation (Rat)	40053101	LC ₅₀ > 6.3 mg/L	IV
Eye Irritation (Rabbit)	250090	Corneal opacity	I
Dermal Irritation (Rabbit)	250090	No dermal effects	IV
Dermal Sensitization (Guinea pig)	43062806	Not a skin sensitizer	N/A

Table 3: MCPA 2-EHE Acute Toxicity

Study Type	MRID No.	RESULTS	Toxicity Category
Acute Oral (Rat)	156458	LD ₅₀ = 1793 mg/kg	III
Acute Dermal (Rabbit)	156459	LD ₅₀ > 2000 mg/kg	III
Acute Inhalation (Rat)	156460	LC ₅₀ > 1.9 mg/L	III
Eye Irritation (Rabbit)	156522	No eye irritation	IV
Dermal Irritation (Rabbit)	156456	No dermal effects	IV
Dermal Sensitization (Guinea pig)	40352001	Skin sensitizer	N/A

Table 4: MCPA Amine Acute Toxicity

Study Type	MRID No.	RESULTS	Toxicity Category
Acute Oral (Rat)	256980	LD ₅₀ = 1876 mg/kg	III
Acute Dermal (Rabbit)	256980	LD ₅₀ > 2000 mg/kg	III
Acute Inhalation (Rat)	42113103	LC ₅₀ > 1.69 mg/L	III
Eye Irritation (Rabbit)	256980	Corneal opacity	I
Dermal Irritation (Rabbit)	256980	Slight dermal irritant	III
Dermal Sensitization (Guinea pig)	40352101	Not a skin sensitizer	N/A

Table 5: MCPA Sodium Salt Acute Toxicity

Study Type	MRID No.	RESULTS	Toxicity Category
Acute Oral (Rat)	256979	LD ₅₀ = 3105 mg/kg	III
Acute Dermal (Rabbit)	256979	LD ₅₀ > 2000 mg/kg	III
Acute Inhalation (Rat)	260067	LC ₅₀ > 1.6 mg/L	III
Eye Irritation (Rabbit)	256979	Corneal opacity	I
Dermal Irritation (Rabbit)	256979	moderate irritation	III
Dermal Sensitization (Guinea pig)	41613003	Not a skin sensitizer	N/A

A brief overview of the studies used for the dietary risk assessment is outlined in Table 6 in this document. Additional details regarding the dietary risk assessment can be found in the Revised MCPA Acute and Chronic Dietary Exposure Assessments for the Reregistration Eligibility Decision, dated June 2, 2004.

Table 6: Summary of Toxicological Endpoints and Other Factors Used in the Human Dietary Risk Assessment of MCPA

Assessment	Dose (NOAEL) (mg/kg/day)	Endpoint	Study	Uncertainty Factor ¹	FQPA Safety Factor	PAD (mg/kg/day)
Acute Dietary (General population)	50	Clinical signs of neurotoxicity	Developmental toxicity study with MCPA DMAS in rats at a LOAEL of 150 mg/kg/day (MRID 44954102)	1,000x	1x	0.05
Acute Dietary (Females, 13 - 50 years old)	40	Total litter resorptions	Developmental toxicity study with MCPA 2-EHE in rats at a LOAEL of 120 mg/kg/day (MRID 44954101)	1,000x	1x	0.04
Chronic Dietary	4.4	Hepatotoxicity and nephrotoxicity	Chronic toxicity and carcinogenicity study in rats with a LOAEL of 17.6 mg/kg/day (MRID 40634101)	1,000x	1x	0.0044
Cancer	Classification: Not likely to be carcinogenic to humans					

¹Uncertainty factor of 1,000 is the result of a 10x for interspecies variability, a 10x factor for intraspecies variability, and 10x to account for the lack of a developmental neurotoxicity study.

b. FQPA Safety Factor

The Food Quality Protection Act (FQPA) directs EPA, in setting pesticide tolerances, to use an additional tenfold margin of safety to protect infants and children, taking into account the potential for pre- and postnatal toxicity and the completeness of the toxicology and exposure databases. The statute authorizes EPA to modify this tenfold FQPA safety factor with a different FQPA factor only if reliable data demonstrate that the resulting level of exposure would be safe for infants and children.

FQPA Special Safety Factor

The Agency reduced the default 10X FQPA Special Safety Factor for potential special sensitivity in infants and children to 1X after evaluating the hazard and exposure data for MCPA. The toxicity database includes acceptable developmental and reproduction studies on MCPA, and there is no evidence except in the developmental toxicity study with MCPA 2-EHE (quantitative or qualitative) of susceptibility following *in utero* exposure to rats. Also, there is a low level of concern and no residual uncertainties for the effects seen in the developmental toxicity study in rats after establishing toxicity endpoints and traditional uncertainty factors to be used in the risk assessment. Therefore, the 10X FQPA Special Safety Factor was reduced to 1X.

Database Uncertainty Factor

EPA concluded that a developmental neurotoxicity study is necessary to further characterize the potential for pre-natal neurotoxicity due to the presence of clinical signs indicative of neurotoxicity in acute and subchronic studies. The MCPA toxicology database does not include a DNT study. Therefore, the

Agency applied a 10X Database Uncertainty Factor for assessing risks from exposure scenarios expected for children or pregnant women. The Agency believes that with the application of the Database Uncertainty Factor, the regulatory endpoints are protective of children despite the need for a DNT study.

Note that based on an analysis of DNT studies previously submitted, the Agency has revised the size of the Database Uncertainty Factors for all dietary and residential risk scenarios, other than for acute exposures (see Section IV.C.1.c).

c. Population Adjusted Dose (PAD)

The PAD is a term that characterizes the dietary risk of a chemical and reflects the Reference Dose, either acute or chronic, that has been adjusted to account for the FQPA safety factor (i.e., RfD/FQPA safety factor). In the case of MCPA, the FQPA safety factor is 1; therefore, the acute or chronic RfD is equal to the acute or chronic PAD. A risk estimate that is less than 100% of the acute or chronic PAD does not exceed the Agency's risk concern.

Acute PAD:

The acute PAD is the dose an individual could be exposed to on any given day and no adverse health effects would be expected to occur. A rat developmental toxicity study with MCPA DMAS resulted in a NOAEL of 50 mg/kg/day for the general population based on clinical signs of neurotoxicity. A rat developmental toxicity study with MCPA 2-EHE resulted in a NOAEL of 40 mg/kg/day for females that are 13 to 50 years old, based on total litter resorptions. The uncertainty factors selected were 10x for intra-species uncertainty, 10x for inter-species uncertainty, and 10x to account for the lack of a developmental neurotoxicity study, for a total uncertainty factor (UF) of 1,000x.

General Population:

Acute RfD = 50 mg/kg/day (NOAEL) ÷ 1,000 (UF) = 0.05 mg/kg/day.

Acute PAD = Acute RfD ÷ FQPA Safety Factor (1) = 0.05 mg/kg/day.

Females 13-50 years old:

Acute RfD = 40 mg/kg/day (NOAEL) ÷ 1,000 (UF) = 0.04 mg/kg/day.

Acute PAD = Acute RfD ÷ FQPA Safety Factor (1) = 0.04 mg/kg/day.

Chronic PAD:

A chronic reference dose for all populations was derived from a chronic toxicity and carcinogenicity study in rats. The study results yielded a NOAEL of 4.4 mg/kg/day based on hepatotoxicity and nephrotoxicity in rats at a LOAEL of 17.6 mg/kg/day. The uncertainty factors selected were 10x for intra-species uncertainty, 10x for inter-species uncertainty, and 10x to account for the lack of a developmental neurotoxicity study, for a total uncertainty factor (UF) of 1,000x.

Chronic RfD = 4.4 mg/kg/day (NOAEL) ÷ 1,000 (UF) = 0.0044 mg/kg/day.

Chronic PAD = Chronic RfD ÷ FQPA Safety Factor (1) = 0.0044 mg/kg/day.

d. Exposure Assumptions

The acute dietary exposure to MCPA was estimated using DEEM-FCID™, Version 1.30, which incorporates food consumption data from USDA's Continuing Survey of Food Intake by Individuals (CSFII), 1994-1996, 1996. An unrefined Tier 1 assessment was conducted. For acute exposure, the level of residue present on the various commodities was assumed to be the current tolerance levels for MCPA acid as set forth at 40 CFR §180.339(a), and it was assumed that 100% of the various crops was treated with MCPA.

Both DEEM™ and Lifeline™ were used to calculate the chronic dietary exposure estimates based on average consumption for the U.S. population and population subgroups including infants and children. For the chronic dietary analysis, the level of residue present on the various commodities was assumed to be the current tolerance levels for MCPA acid as set forth at 40 CFR §180.339(a), and percent crop treated information was incorporated.

e. Food Risk Characterization

Generally, a dietary risk estimate that is less than 100% of the acute or chronic PAD is not of concern. The acute dietary risk from MCPA residues on food is below the Agency's level of concern; that is, less than 100% of the acute PAD is utilized. For the most exposed subgroup, children (1-2 years), the percent acute PAD value is 36 at the 95th percentile of exposure.

The chronic dietary risk from food alone is not of concern. For the most exposed subgroup, children (1 to 2 years old), the percent chronic PAD value is 87.

2. Dietary Risk from Drinking Water

Drinking water exposure to pesticides can occur through ground water and surface water contamination. EPA considers both acute (one day) and chronic (lifetime) drinking water risks and uses either modeling or actual monitoring data, if available, to estimate those risks. Modeling is carried out in tiers of increasing refinement, but is designed to provide high-end estimates of exposure.

The Office of Pesticide Programs (OPP) adopted an environmental fate strategy for MCPA based on linking the dissociation of the salts of MCPA and the hydrolysis of the MCPA 2-EHE to its free acid, MCPA. In a dissociation study, MCPA-dimethylammonium salt completely dissociated to MCPA and dimethylammonium ion within 1.5 minutes of stirring in deionized water. Therefore, fate studies with MCPA will provide data regarding the behavior of MCPA-dimethylamine salt.

Existing MCPA monitoring data evaluated in this exposure assessment were available from the United States Geological Survey (USGS) National Water-Quality Assessment (NAWQA) Program, the United States Environmental Protection Agency (USEPA) STORage and RETrieval System for Water and Biological Monitoring Data (STORET), and recently released data from the USGS Pilot Reservoir Monitoring Study. The data were evaluated for magnitude and frequency of MCPA occurrence. Annual maximum concentrations and frequency of detection were determined from each data set. Time weighted annual mean (TWM) concentrations were determined for the NAWQA and STORET data. The frequency of detection of MCPA from the USGS Pilot Reservoir Monitoring Study was not sufficient to calculate TWM concentrations from these data. The highest annual maximum concentration of MCPA detected in surface water is 18.58 ug/l from the NAWQA (station 4161820) study. The maximum TWM concentration of MCPA in surface water is 1.49 ug/l from the NAWQA (station 4161820) study. The monitoring data were not targeted to MCPA use areas.

Modeling was completed to augment the monitoring data. Surface water concentrations were modeled using the Tier II PRZM version 3.12/ EXAMS version 2.98.04 model and the EFED graphical interface (PE4.pl dated January 9, 2003). Ground water concentrations were modeled using the Tier I SCIGROW version 2.2 model. Eight different crop scenarios were modeled to represent all registered uses and included wheat in North Dakota and Oregon, peas in Oregon, sorghum in Kansas, and rangeland/pastureland in California, Pennsylvania, and Minnesota. The OPP standard scenario for alfalfa was used as a surrogate for rangeland/pastureland in California, Pennsylvania, and Minnesota because its hydrologic and agronomic practices closely match those of pasture/rangeland and OPP does not have a currently approved pasture/rangeland scenario. The PRZM/EXAMS scenarios selected for modeling represent all available OPP scenarios for registered MCPA uses.

a. Surface Water

Based on modeling results, the estimated surface water-derived drinking water concentrations for the use of MCPA are:

47.3 ug/l for the 1 in 10 year annual peak concentration (acute)

1.9 ug/l for the 1 in 10 year annual mean concentration (non-cancer chronic)

The PRZM/EXAMS model results were use in the human health risk assessment, rather than monitoring data, because the monitoring data available for MCPA is not specific to areas of use of MCPA.

The recommended concentrations in surface water were derived from the Pennsylvania pasture scenario. The predicted surface water-derived drinking water concentrations will vary depending on regional climate, soil, environmental characteristics, and watershed characteristics. These model estimates are approximately double the peak (acute) concentration of 18.58 ug/l detected in the monitoring data and roughly equivalent to the maximum TWM concentration of 1.49 ug/l.

Rice

Although the MCPA Task Force has indicated that the rice use of MCPA will not be supported, an end use product is currently registered for rice. For that reason, the Agency prepared an assessment to predict MCPA concentrations in surface source drinking water impacted from rice tail water releases. MCPA concentrations in surface source drinking water impacted from rice production were estimated using an interim screening level model developed by OPP. Model simulation of the maximum seasonal MCPA application rate of 1.25 pounds ae/acre results in a screening level peak and chronic drinking water concentration of 1222 ug/l. This value is expected to represent bounding concentration for peak and annual average drinking water concentrations for MCPA because the model represents an edge of paddy concentration rather than an actual concentration at a drinking water utility. Additionally, the model does not account for degradation, dilution, and dispersion of MCPA. Although, based on a Kd value of 0.6 ml/g, MCPA is expected to be highly mobile in tailwater from rice paddies, it is expected to degrade relatively rapidly in soil and be fairly persistent in aquatic environments. As expected, the estimated MCPA concentration from the interim model is higher than concentrations detected in the surface water monitoring data evaluated as part of this assessment. The highest concentration of MCPA detected in surface water was 18.58 ug/l from the NAWQA data. The highest concentration of MCPA detected in surface water in several locations within and downstream of California counties for which MCPA was used on rice was 0.94 ug/l (from NAWQA data). Rice is grown in areas of California, Arkansas, Mississippi, Louisiana, and Texas. It is unlikely that there will be concentrations of MCPA as high as the modeled estimate in surface water source drinking water due to use on rice.

b. Ground Water

The SCI-GROW model estimate of MCPA concentration in drinking water from shallow groundwater sources is **2.13 ug/l** using the pasture/rangeland application rate of 4 lbs. ae/acre. MCPA was not detected in the NAWQA or STORET groundwater monitoring data evaluated for this assessment. The estimated concentration can be considered as both the acute and chronic value.

Rice

SCI-GROW modeling estimates the acute and chronic concentration of MCPA in shallow groundwater from use on rice at a rate of 1.25 lbs ae/acre is 0.59 ug/l.

c. Drinking Water Levels of Comparison (DWLOCs)

Exposure to pesticides through drinking water can occur as a result of groundwater or surface water contamination. EPA considers both acute (one day) and chronic (multiple year) drinking water risks. To determine the maximum allowable contribution from water allowed in the diet, EPA first looks at how much of the overall risk is contributed by food and then determines a “drinking water level of comparison” (DWLOC). The DWLOC represents the maximum allowable contribution to the human diet that may be attributed to residues of a pesticide in drinking water after dietary exposure is subtracted from the aPAD or cPAD. Risks from drinking water are assessed by comparing the DWLOC to the estimated

environmental concentrations (EECs) in surface water and ground water. Generally, the Agency has no risk concerns when the EECs are below the DWLOC.

The results of the Agency's drinking water analysis are summarized in this document. Details of this analysis are found in the Revised Human Health Risk Assessment, dated June 4, 2004. Table 7, below, presents the calculations for the acute drinking water assessment, and Table 8 presents the calculations for the chronic drinking water assessment.

Table 7: MCPA: Summary of Acute DWLOC Calculations

Population Subgroup	aPAD (mg/kg/day)	Food Exposure ¹ (mg/kg/day)	Available Water Exposure ² (mg/kg/day)	DWLOC ³ (ug/l)
General U.S. Population	0.05	0.0084	0.042	1455
Females 13-50 yrs	0.04	0.0045	0.036	1066
Children 1-2 yr	0.05	0.018	0.032	322
All Infants	0.05	0.011	0.039	392

¹ Food Exposure = aPAD x % aPAD accounted for by food

² Available water exposure = aPAD - food exposure

³ DWLOC = $\frac{\text{water exposure} \times \text{body weight}}{\text{Liters of water} \times 10^{-3}}$

where body weight = 70 kg for U.S. Population, 60 kg for females, 10 kg for infants and children

Liters of water = 2L for Adults and 1L for infants and children

Table 8: MCPA: Summary of Chronic DWLOC Calculations

Population Subgroup	cPAD (mg/kg/day)	Food Exposure ¹ (mg/kg/day)	Available Water Exposure ² (mg/kg/day)	DWLOC ³ (ug/l)
General U.S. Population	0.0044	0.0012	0.0032	111
Females 13-50	0.0044	0.00086	0.0035	106
Children 1-6 yr.	0.0044	0.0038	0.00059	5.88
All Infants	0.0044	0.00099	0.0034	34.08

¹ Food Exposure = cPAD x % cPAD accounted for by food

² Available water exposure = cPAD - food exposure

³ DWLOC = $\frac{\text{water exposure} \times \text{body weight}}{\text{Liters of water} \times 10^{-3}}$

where body weight = 70 kg for U.S. Population, 60 kg for females, 10 kg for infants and children

Liters of water = 2L for Adults and 1L for infants and children

Table 9, below, presents a comparison of the EECs with the DWLOCs. The EECs are below the DWLOC values, which indicates that the drinking water residue contribution to the acute and chronic dietary risk from MCPA is not of concern to the Agency.

Table 9: MCPA: Acute and Chronic DWLOC Values Compared to Modeled EECs

Population Subgroup	Assessment Type	DWLOC (ug/l)	EEC (Surface Water) (ug/l)	EEC (Ground Water) (ug/l)
General U.S. Population	acute	1455	47.3	2.13
Females 13-50 yrs.		1066	47.3	2.13
Children 1-2 yrs.		322	47.3	2.13
All Infants		392	47.3	2.13
General U.S. Population	Chronic	111	1.9	2.13
Females 13-50		106	1.9	2.13
Children 1-6 yr.		5.88	1.9	2.13
All Infants		34.08	1.9	2.13

3. Residential Exposure and Risk

MCPA is registered for use by homeowners in the residential environment to kill weeds on lawns. It is also used by professional law care operators on residential lawns. Residents may be exposed to MCPA through mixing, loading, or applying the pesticide, or by entering a treated site after a residential or commercial applicator (pest control operator and law care operator) has applied MCPA.

Residential risk is measured by a Margin of Exposure (MOE), which measures how close the residential exposure comes to the NOAEL from animal studies. Generally, MOEs that are greater than 100 do not exceed the Agency's level of concern (this incorporates the standard uncertainty factors of 10x for interspecies variability and 10x for intraspecies variability). However, for the MCPA residential exposure assessment, the level of concern is 1,000 because it also includes a 10X Database Uncertainty Factor to account for the lack of a developmental neurotoxicity study. Thus, scenarios that yield MOEs below 1,000 may indicate a risk concern.

For more details about the residential risk assessment, see the MCPA Revised Occupational and Residential Exposure and Risk Assessment, dated June 11, 2004, which is available in the public docket. A summary of the inputs and results of this risk assessment are presented below.

a. Toxicity

The toxicological endpoints used for the residential risk assessment are provided in Table 10.

Table 10: MCPA Toxicological Endpoints Used for Residential Risk Assessment

Exposure Scenario	Dose or Factor Used in Risk Assessment	Study	Toxicological Effects
Dermal – Short and Intermediate Term	Dermal NOAEL= 100 mg/kg/day	21-day dermal toxicity study in rats	LOAEL = 1000 mg/kg/day based on nephrotoxicity and decrease in body weight gain.
Inhalation – Short and Intermediate Term	NOAEL = 4.4 mg/kg/day ¹	Chronic toxicity and carcinogenicity study in rats	LOAEL = 17.6 mg/kg/day based on hepatotoxicity and nephrotoxicity.
Incidental Oral – Short and Intermediate Term	NOAEL= 4.4 mg/kg/day ²	Subchronic neurotoxicity and chronic toxicity studies	Neurotoxicity, renal, and testicular toxicities

¹ Inhalation absorption is assumed to be equivalent to oral absorption (100%)

² The Agency selected the dose of 4.4 mg/kg/day for short- and intermediate-term incidental oral exposure risk assessments based on the similarity of toxicity seen in the subchronic neurotoxicity studies in rats with the acid, DMAS, and 2-EHE forms, as well as the toxicity seen following chronic exposure in rats with the acid.

b. Residential Handler Risk

(1) Exposure Scenarios, Data, & Assumptions

Potential residential exposures can occur as a result of residential application to lawns. The residential products are typically formulated as dry weed or feed products or as liquids in concentrates or ready to use sprays. Many of these formulations include other herbicides such as 2,4-D, MCPP-p, and dicamba. Both spot and broadcast treatments are included on the labels.

The following residential scenarios were evaluated:

- (1) Hand application of granules;
- (2) Belly grinder application;
- (3) Loading/Applying granules with a broadcast spreader;
- (4) Mixing/Loading/Applying with a hose-end sprayer (mix-your-own);
- (5) Mixing/Loading/Applying with a hose-end sprayer (ready-to-use);
- (6) Mixing/Loading/Applying with a hand-held pump sprayer; and
- (7) Mixing/Loading/Applying with a ready-to-use sprayer.

The duration of exposure is expected to be short term for broadcast treatments because the label allows only two broadcast treatments per year. Exposures are also expected to be short term in duration for spot treatments because the labels recommend repeat applications in two to three weeks for hard-to-kill weeds.

No chemical-specific data were submitted for residential handler risk assessment, so values from the Pesticide Handler Exposure Database (PHED) and the Outdoor Residential Exposure Task Force (ORETF) were used. Exposure data for scenarios #1 and 2 were taken from PHED, and exposure data for scenarios #3, 4, and 5 were taken from the residential portion of the ORETF Handler Study (MRID 44972201). Exposure data for scenarios #6 and 7 were taken from MRID 44459801, another study owned by the ORETF. A more complete discussion of the ORETF studies from which the exposure information was derived is provided in the Occupational and Residential Exposure and Risk Assessment (revised version, dated June 11, 2004).

For all residential scenarios, the exposure estimates assume that individuals wear short pants, short sleeves and no gloves. It was assumed that broadcast spreaders and hose-end sprayers would be used for broadcast treatments and the other application methods would be used for spot treatments only. It was also assumed that an area of 0.5 acres would be treated during broadcast applications, and that an area of 0.023 acres (1,000 square feet) would be treated per application during spot treatments. Further, it was assumed that the application rate is 2.0 lb ae/acre.

(2) Residential Handler Risk Estimates and Risk Characterization

A summary of the short-term risk estimates for residential handlers is presented in Table 11. As noted previously, risk estimates are expressed in terms of an MOE. Residential application of MCPA products to lawns resulted in risk estimates that are not a risk concern to the Agency (i.e., total MOE > 1,000) for all scenarios except mixing/loading/applying with a hose-end sprayer (mix-your-own formulation). The mix-your-own hose-end sprayer scenario had an MOE of 620, and therefore exceeded the Agency's level of concern.

Note that based on an analysis of DNT studies previously submitted, the Agency has revised the Database Uncertainty Factors for all dietary and residential risk scenarios, other than for acute exposures (see Section IV.C.1.c). Using the revised uncertainty factors, in addition to data from a new dermal absorption study and lowered application rates, short-term risks to residential handlers are not of concern (see Section IV.D.1.c.1).

Table 11: MCPA Short-Term MOEs for Homeowner Application to Lawns

Equipment Type	Application Rate (lb ae/acre)	Dermal MOE (a)	Inhalation MOE (b)	Combined MOE (c) (MOE Level of Concern = 1000)
(1) Applying granules by hand or shaker can	2.0	1300	14,000	1200
(2) Loading/Applying granules with a belly grinder	2.0	1400	110,000	1400
(3) Loading/Applying granules with a broadcast spreader	2.0	10,000	3,400,000	10000
(4) Mixing/Loading/Applying liquids with a hose-end sprayer (mix-your-own)	2.0	640	19,000	620
(5) Mixing/Loading/Applying liquids with a hose-end sprayer (ready-to-use)	2.0	2700	28000	2500
(6) Mixing/Loading/Applying liquids with hand-held pump sprayer	2.0	4000	1,500,000	4000
(7) Mixing/Loading/Applying liquids with ready-to-use sprayer	2.0	2800	190,000	2800

- (a) Dermal MOE = NOAEL (100 mg/kg/day) / Daily Dermal Dose mg/kg/day). The NOAEL is from a dermal study. Therefore, no adjustment is made for dermal absorption.
- (b) Inhalation MOE = NOAEL (4.4 mg/kg/day) / Daily Inhalation Dose (mg/kg/day). An oral NOAEL was used to calculate the inhalation MOE. Inhalation absorption was assumed to equivalent to oral absorption.
- (c) Total MOE = 1/ (1/MOE dermal + 1/MOE inhalation).

d. Residential Postapplication Risk

(1) Exposure Scenarios, Data, & Assumptions

Exposure Scenarios

Potential residential postapplication exposures to adults and children may occur as a result of residential application or professional lawn care operator application of MCPA products. Specifically, adult and child exposures were evaluated as a result of ornamental, golf course, and recreational turf and home lawn uses. Guidance from the Agency's Residential SOPs was used to address the exposures of children contacting recently treated turf. The SOPs use a high contact activity to represent the exposures of an actively playing child.

The following residential postapplication scenarios were evaluated:

- (1) Acute and short-term exposures of toddlers playing on treated turf;

- (2) Acute and short-term exposures of adults performing yardwork on treated turf;
- (3) Acute and short-term exposures of adults playing golf on treated turf.

Data Sources

There were three chemical-specific turf transferable residue (TTR) studies that were submitted by the Broadleaf Turf Herbicide TTR Task Force. These studies measured the dissipation of several phenoxy herbicides, including MCPA, using the ORETF roller technique (which is also called the modified California Roller). The studies have been reviewed by The Agency and were found to meet all of the series 875 guidelines for postapplication exposure monitoring. The TTR studies are discussed in detail in Appendix E of the MCPA Revised Occupational and Residential Exposure and Risk Assessment, dated June 11, 2004. Table 12, below, provides a summary of the TTR data used for the MCPA post application exposure assessment.

Table 12: Summary of Turf Transferable Residue Data Used for MCPA Post Application Exposure Assessment

Study MRID	44655702	44655702	45033101
Location	North Carolina	North Carolina	California
Precipitation	No Rain	No Rain	No Rain
Application Rate	1.55	1.55	1.47
MCPA Form Applied	DMAS	2-EHE	DMAS Mix
Maximum TTR	0.53	0.318	0.26
% Maximum TTR	3.1 - Note 1	1.8	1.6
Day 0 Average TTR	0.231	0.31	0.20
% Average TTR	1.3	1.8 - Note 2	1.2 - Note 2
Semi-log Slope Factor	-0.68	-0.73 - Note 2	-0.44 - Note 2
Days to LOQ	7	7	greater than 7
Note 1 - This value was used to derive the TTR for 1day acute exposures.			
Note 2 - These values were used to derived the TTR for seven day average short term exposures.			

Assumptions

It was assumed that the maximum label application rate of 2.0 lbs ae/acre was used. Additionally, the following general assumptions, from the Standard Operating Procedures (SOPs) of December 18, 1997, and ExpoSAC Policy #12, "Recommended Revisions to the Standard Operating Procedures for Residential Exposure Assessments of February 22, 2001" were used:

- (1) The TTR values were used for calculating dermal exposures on turf because they were greater than 1.0% of the application rate. The TTR values were adjusted by a factor of 1.33 to account for the label application rate of 2.0 lb ae/acre vs the TTR study application rate of 1.5 lb ae/acre.
- (2) An assumed initial TTR value of 5.0% of the application rate is used for assessing hand to mouth exposures.
- (3) An assumed initial TTR value of 20% of the application is used for assessing object to mouth exposures.
- (4) Soil residues are contained in the top centimeter and soil density is 0.67 mL/gram.
- (5) Three-year-old toddlers are assumed to weigh 15 kg.
- (6) Hand-to-mouth exposures are based on a frequency of 20 events/hour and a surface area per event of 20 cm² representing the palmar surfaces of three fingers.
- (7) Saliva extraction efficiency is 50 percent meaning that every time the hand goes in the mouth approximately ½ of the residues on the hand are removed.
- (8) Adults are assessed using a transfer coefficient of 14,500 cm²/hour.
- (9) Toddlers are assessed using a transfer coefficient of 5,200 cm²/hour.
- (10) Golfers are assessed using a transfer coefficient of 500 cm²/hour.
- (11) An exposure duration of 2 hours per day is assumed for toddlers playing on turf or adults performing heavy yardwork.
- (12) An exposure duration of 4 hours is assumed for playing golf.

(2) Residential Postapplication Risk Estimates and Risk Characterization

Table 13, below, presents the residential turf MOEs for toddlers. The total MOE includes the dermal, hand-to-mouth, object-to-mouth, and soil ingestion pathways. MOEs that are below 1,000 exceed EPA's level of concern for residents, children, or other non-occupationally exposed individuals. As shown in bold, the short-term MOE for toddlers was below 1,000, and therefore was of concern. The total short term MOE using the maximum TTR value was 280. Dermal exposure was the risk driver that caused the total MOE to be low.

Note that based on an analysis of DNT studies previously submitted, the Agency has revised the Database Uncertainty Factors for all dietary and residential risk scenarios, other than for acute exposures (see Section IV.C.1.c). Using the revised uncertainty factors, in addition to data from a new dermal absorption study and lowered application rates, short-term postapplication residential risks are not of concern (see Section IV.D.1.c.2).

Also, based on the new dermal absorption study and lowered application rates, acute risk estimates are now significantly lower (total MOE = 940; see Section IV.D.1.c), which only slightly exceeds the Agency's level of concern. Because the MOE for combined toddler acute exposures may be of concern to the Agency, the MCPA Task Force has committed to undertake a study to determine the dermal

transfer efficiency of MCPA residues from turf to dry and wetted palms. This hand-press study is intended to confirm that the transfer coefficient used in the toddler exposure assessment is conservative and overestimates risk from mouthing behaviors. The Agency believes that the chemical-specific data in this study will verify that the residue dislodgeable from wet hands is, to some degree, less than the 5% default used in the assessment. This study must be submitted within the 9-month time period allotted to submit revised labels for MCPA.

Table 13: Toddler MOEs for Exposure to Turf Treated with MCPA

Residue Time Segment	Application Rate (lbs ae/acre)	TTR (ug/cm ²)	Dermal MOE	Hand-to Mouth MOE	Object to Mouth MOE	Soil Ingestion MOE	Total MOE
Acute Toddler Risks Using the Maximum TTR (North Carolina Trial 1 using MCPA DMAS)							
MAX TTR	2.0	0.685 ^A	350	1700	6700	>100000	280
Short Term Toddlers Risks Using California TTR Data (MCPA DMAS Mix, No Rain)							
Avg of DAT 0 to DAT 6	2.0	0.13 ^B	1100	380	1500	>100000	380
Short Term Toddler Risks Using North Carolina TTR Data from Trial 1 (MCPA 2-EHE, No Rain)							
Avg of DAT 0 to DAT 6	2.0	0.108 ^C	1300	540	2100	>100000	470
<p>A. This value was derived from the maximum TTR of 3.1 percent (0.531 ug/cm² at 1.55 lb ae/acre) which occurred on DAT 1.</p> <p>B. This value was derived from the initial TTR of 1.6 percent (0.263 ug/cm² at 1.47 lb ae/acre) and the regression slope factor of -0.44X.</p> <p>C. This value was derived from the initial TTR of 1.8 percent (0.306 ug/cm² at 1.54 lb ae/acre) and the regression slope factor of -0.73X.</p>							

The MOEs for adult exposures are summarized in Table 14. The acute MOEs were calculated using the maximum TTR. The short-term MOEs were calculated using the seven-day average TTR from the California site. As shown in bold, the MOEs for acute exposure during heavy yardwork did not exceed 1000, and therefore were of concern to the Agency.

Note that based on an analysis of DNT studies previously submitted, the Agency has revised the Database Uncertainty Factors for all dietary and residential risk scenarios, other than for acute exposures (see Section IV.C.1.c). Using the revised uncertainty factors, in addition to data from a new dermal absorption study and lowered application rates, short-term postapplication residential risks are not of concern (see Section IV.D.1.c.2).

Table 14: Adult Acute and Short-term MOEs for Exposure to Turf Treated with MCPA

Exposure Scenario	Application Rate (lbs ae/acre)	TTR (ug/cm ²)	Females 13 to 50	All Other Adults	All Adults
			Acute Dermal MOE	Acute Dermal MOE	Short Term Dermal MOE
Heavy Yardwork	2.0	0.685 ^A	400	590	1900
Playing Golf	2.0	0.13 ^B	5800	8500	27000

Exposure Scenario	Application Rate (lbs ae/acre)	TTR (ug/cm2)	Females 13 to 50	All Other Adults	All Adults
			Acute Dermal MOE	Acute Dermal MOE	Short Term Dermal MOE
A. This value was derived from the maximum TTR of 3.1 percent (0.531 ug/cm ² at 1.55 lb ae/acre) which occurred on DAT 1.					
B. This value was derived from the initial TTR of 1.6 percent (0.263 ug/cm ² at 1.47 lb ae/acre) and the regression slope factor of -0.44X.					

3. Aggregate Risk

The Food Quality Protection Act amendments to the Federal Food, Drug, and Cosmetic Act (FFDCA, Section 408(b)(2)(A)(ii)) require “that there is reasonable certainty that no harm will result from aggregate exposure to pesticide chemical residue, including all anticipated dietary exposures and other exposures for which there are reliable information.” Aggregate exposure will typically include exposures from food, drinking water, residential uses of a pesticide, and other non-occupational sources of exposure.

The Agency has developed several guidance documents describing the mathematical approaches used in calculating aggregate risks, the theoretical basis for these calculations, and the interpretation of the Food Quality Protection Act that requires the Agency to complete these kinds of calculations.¹ The underlying approach, regardless of the calculation type, is the same. The overall, allowable risks associated with an individual chemical is first determined by its hazard database and its associated uncertainty factors or negligible risks if the concern is cancer (i.e., an exposure limit is defined). Once limits have been defined, contributions from different sources are then added to obtain aggregate exposures (dietary [food only] and residential) which are compared to the exposure limit to see if it has been exceeded which would indicate a risk concern. If the aggregate exposure limit has not been exceeded, the unallocated portion under it, which is attributed to drinking water by convention as the DWLOC (Drinking Water Level of Concern) is then compared to environmental water concentration (EEC or Estimated Environmental Concentration) to see if the EEC exceeds the DWLOC, which would also indicate a risk concern. The Agency would not have a risk concern if DWLOCs were calculated and EECs were less than the DWLOCs.

MCPA is a food use chemical. Drinking Water Levels of Comparison (DWLOCs) have been calculated, and there are residential (non-occupational) uses of MCPA. Therefore, the considerations for aggregate exposure to MCPA are those from food, drinking water, and residential exposure. For MCPA, aggregate risk assessments were conducted for acute (one day) and short-term (one to thirty days). Intermediate and chronic aggregate risks were not assessed because there are no expected intermediate and chronic residential exposures.

¹ There are several aggregate risk guidance documents that address both deterministic and probabilistic risk assessment approaches. The major science policy papers are available at www.EPA.Gov/pesticides. The two key documents used for this assessment are 1) *Updated Interim Guidance For Incorporating Drinking Water Exposure Into Aggregate Risk Assessments* (Stasikowski, 8/1/99) and 2) *HED RARC Format and Risk Characterization Guidance* (12/22/00).

a. Acute Aggregate Risk Estimates and Risk Characterization

The acute residential turf exposures were not aggregated with the acute dietary exposures because it is extremely unlikely that acute turf exposures would occur concurrently with the acute dietary exposures. The risks of acute turf exposure were based upon high-end exposures from four individual pathways which include dermal exposure, hand-to-mouth exposure, object-to-mouth exposure, and soil ingestion, while the risks of acute dietary exposure were based upon high-end estimates of food residues and consumption patterns. Currently available distributional assessments lend support to the low likelihood of experiencing concurrent high-end exposures from all of these sources, and if necessary, chemical-specific higher-tier distributional assessments can be run if there is reason to believe that the assumptions made in the individual acute assessments will underestimate risks.

b. Short-term Aggregate Risk Estimates and Risk Characterization

An aggregate exposure assessment that quantifies short-term risks from food, water, and residential sources was not conducted because the Agency had concern regarding short-term risks from residential exposure alone. Note, however, that based on an analysis of DNT studies previously submitted, the Agency has revised the Database Uncertainty Factors for all dietary and residential risk scenarios, other than for acute exposures (see Section IV.C.1.c). Using the revised uncertainty factors, in addition to data from a new dermal absorption study and lowered application rates, the Agency determined that short-term residential risks are not of concern (see Section IV.D.1.c). See Section IV.C.1.d.1 for a calculation of the short-term aggregate risks from food, water, and residential sources, which are not of concern to the Agency.

c. Chronic Aggregate Risk Estimates and Risk Characterization

No chronic residential scenarios have been identified for MCPA. Therefore, chronic DWLOCs for MCPA were calculated based on tolerance level residues in food alone. These values are presented in Table 15. Comparison of the chronic DWLOCs with the environmental concentrations of MCPA estimated using PRZM-EXAMS and SCI-GROW modeling indicates that chronic aggregate risks are not of concern. The DWLOCs are less than the surface water EEC of 1.9 ppb and the ground water EEC of 2.13 ug/l. Consequently, there is no chronic aggregate concern for drinking water from surface or groundwater sources.

Table 15: MCPA Summary of Chronic DWLOC Calculations

Population Subgroup	cPAD (mg/kg/day)	Food Exposure (mg/kg/day)	Available Water Exposure (mg/kg/day)	DWLOC (ug/l)
U.S. Population	0.0044	0.001235	0.003165	110
Females 13-50 yrs	0.0044	0.000859	0.003541	110
Children 1-6 yr	0.0044	0.003812	0.000588	5.9
All Infants	0.0044	0.000992	0.003408	34

4. Cumulative Risk

Section 408(b)(2)(D)(v) of the FFDCA requires that, when considering whether to establish, modify, or revoke a tolerance, the Agency consider “available information” concerning the cumulative effects of a particular pesticide's residues and “other substances that have a common mechanism of toxicity.” Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to MCPA and any other substances, and MCPA does not appear to produce a toxic metabolite produced by other substances. For the purposes of this tolerance action, therefore, EPA has not assumed that MCPA has a common mechanism of toxicity with other substances. For information regarding EPA’s efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the policy statements released by EPA’s Office of Pesticide Programs concerning common mechanism determinations and procedures for cumulating effects from substances found to have a common mechanism on EPA’s website at <http://www.epa.gov/pesticides/cumulative/>.

5. Occupational Risk

Occupational workers can be exposed to a pesticide through mixing, loading, and/or applying a pesticide, or re-entering treated sites. Occupational handlers of MCPA include: workers in agricultural environments, turf farms, golf courses, and lawn care professionals. Risk for these potentially exposed populations is measured by a Margin of Exposure (MOE) which determines how close the occupational exposure comes to a No Observed Adverse Effect Level (NOAEL). In the case of MCPA, MOEs greater than 100 do not exceed the Agency's level of concern. This MOE level of concern of 100 is derived from the standard safety factors of 10x for intraspecies variability and 10x for interspecies variability. The additional FQPA 10X Database Uncertainty Factor for protection of infants and children that was used for assessing residential risk does not apply to occupational exposures.

a. Toxicity

The acute toxicity profile for MCPA is listed previously in Tables 2-5. Table 16, below, provides the toxicity endpoints used in the occupational risk assessment for MCPA. An uncertainty factor of 100X, incorporating factors of 10X for intraspecies variability and 10X for interspecies variability, was used for assessing occupational risk. The 10X FQPA Database Uncertainty Factor that was used for the residential risk assessment does not apply to the occupational risk assessment.

Table 16: Toxicity Endpoints for MCPA Occupational Risk Assessment

Exposure Scenario	Dose or Factor Used in Risk Assessment	Study and Toxicological Effects
Dermal (Short/Intermediate Term)	Dermal NOAEL = 100	21-day dermal toxicity study in rabbits LOAEL = 1000 mg/kg/day based on nephrotoxicity and decrease in body weight gain.
Inhalation Short, Intermediate and long-Term	NOAEL = 4.4 mg/kg/day ^A	Chronic toxicity and carcinogenicity study in rats LOAEL = 17.6 mg/kg/day based on hepatotoxicity and nephrotoxicity.
Cancer	Classification: Not likely to be carcinogenic to humans	
Dermal Absorption Factor	30 percent of the oral dose	Dermal absorption study in rats with MCPA DMAS and MCPA 2-EHE.
Uncertainty Factor for Occupational Exposures	100	Includes standard factors of 10X and 10X for intraspecies variability and interspecies extrapolation.
^A Inhalation absorption is assumed to be equivalent to oral absorption (100 percent default value).		

b. Occupational Handler Exposure

Formulation Types

Currently, there are approximately 160 active products of MCPA formulated from 4 different forms. The acid, DMAS, 2-EHE forms of MCPA have the most products. Most of the products are formulated as liquids or granules, although two MCPA acid products are formulated as water soluble powders. These two products are used on turf.

Application Rates, Timing, and Frequency

Typically one application is made per growing season. The label recommended application window for small grains is the four leaf stage up to the boot stage. Applications are not recommended in the boot to dough stage. The label required spray volumes for ground applications range from 20 gallons for most crops to 100 gallons per acre for vine and brush control. MCPA can be applied over the top to the labeled crops.

The maximum application rates range from 0.375 to 4.0 lb ae/acre. One application is made to most crops.

Application Methods

The MCPA labels allow ground and aerial application, however, they do not allow chemigation. Ground applications are made whenever possible due to cost and convenience, while aerial applications are made to rangeland areas where woody weeds are too tall for a tractor (MCPA Smart Meeting, 2001). According to the USDA Crop Profile for Hard Red Spring and Durum Wheats in North Dakota, 93 percent of herbicide applications are made by ground equipment. A listing of application methods and amounts of acreage treated per 8 hour day is included in Table 17.

Table 17: MCPA Application Methods

Application Method	Typical Crops Treated	Treated Area ^a
Large Groundboom	Small Grains, Flax, Peas	200
Average Groundboom	Pasture	80
Golf Course Groundboom	Golf Course Turf	40
Fixed Wing Aircraft	Small Grains, Flax, Peas, Rice, Rangeland	1200
Right of Way (ROW) Sprayer	Weed Control - 20 gallons per acre	50 ^b
Turfgun	Turf	5
Backpack Sprayer - Mix/Load/Apply	Spot Treatment	4 ^c
Tractor Drawn Broadcast Spreader	Turf	40
Push Type Broadcast Spreader	Turf	5

Application Method	Typical Crops Treated	Treated Area ^a
a. Based upon HED Exposac_SOP #9 "Standard Values for Daily Acres Treated in Agriculture", Revised July 5, 2000		
b. Based upon 1000 gallons of spray applied per day from SOP #9 divided by an estimated spray volume of 20 GPA.		
c. Based upon 40 gallons of spray applied per day from SOP #9 divided by an estimated spray volume of 10 GPA.		

Exposure Scenarios

Short- and intermediate-term occupational risks have been assessed. Chronic occupational risks were not assessed because they are generally not expected for agricultural uses, and because chronic occupational exposure is particularly unlikely for MCPA. It is typically applied only once per season, and there is a limited window of time in the growing season during which use of the product is appropriate.

There is potential occupational handler exposure during mixing, loading, and applying products containing MCPA to agricultural crops and turf. Based on the application methods show in Table 17, the following exposure scenarios were assessed.

- (1) Mixing/Loading Wettable Powder
- (2) Mixing/Loading Liquid Formulations
- (3) Loading Granules
- (4) Aerial Application
- (5) Groundboom Application
- (6) Turfgun Application
- (7) Right-of-Way Application
- (8) Broadcast Spreader Application
- (9) Mixing/Loading/Applying Liquids with a Backpack Sprayer
- (10) Mixing/Loading/Applying Wettable Powder with a Turfgun
- (11) Mixing/Loading/Applying Liquids with a Turfgun
- (12) Loading/Applying Granules with a Push Cyclone
- (13) Flag Aerial Application

For agricultural handlers, the estimated exposures initially are assessed assuming handlers are using baseline attire (i.e., long-sleeve shirt, long pants, shoes, and socks). If risk estimates exceed the level of concern for a given scenario with baseline attire, then exposures are assessed with the addition of personal protective equipment (PPE) (i.e., chemical-resistant gloves, double-layer body protection, and/or a respirator) as required. In general, the Agency uses the least PPE necessary to achieve risk estimates that do not exceed the level of concern. If the risk estimates exceed the Agency's level of concern (i.e., if $MOE < 100$) for a given scenario even with the addition of PPE, then the risks are assessed with the use of engineering controls (i.e., closed system mixing/loading and enclosed cabs or cockpits for applying and flagging).

Handler Exposure Assumptions

The following assumptions and factors were used in order to complete the exposure and risk assessments for occupational handlers/applicators.

- The average work day was 8 hours.
- The daily acreages treated were taken from EPA Science Advisory Council for Exposure Standard Operating Procedure #9 “Standard Values for Daily Acres Treated in Agriculture,” Revised July 5, 2000. These values are provided in the ORE Chapter.
- The application rates were generally the maximum rates as listed on one or more labels. The lower Task Force application rate for pasture/rangeland was also used.
- A body weight of 70 kg was assumed because the endpoint is not gender specific.
- The inhalation absorption rate is 100%.
- Baseline is long sleeve shirts, long pants, shoes plus socks, and no gloves or respirator.
- Single Layer PPE includes baseline PPE with chemical resistant gloves.
- Double Layer PPE includes coveralls over single layer PPE with chemical resistant gloves.
- PF5 indicates a filtering facepiece respirator (i.e. a dustmask) with a protection factor of 5 when properly fitted.
- PF10 indicates a half mask elastomeric facepiece respirator with a protection factor of 10 when properly fitted and used with appropriate cartridges.
- Only closed cockpit airplanes are used for aerial application.
- Airplane pilots do not wear chemical resistant gloves.

Handler Exposure Data Sources

Handler exposure data generated by the Outdoor Residential Exposure Task Force (ORETF) were used for assessing the following lawn care operator scenarios:

- Turfgun Application
- Mix/Load/Apply Water Dispersable Granules with a Turfgun
- Mix/Load/Apply Wettable Powder with a Turfgun
- Mix/Load/Apply Liquids with a Turfgun
- Load/Apply Granules with a Push Cyclone

The remainder of the exposure scenarios were analyzed using data from the Pesticide Handlers Exposure Database (PHED). PHED was designed by a task force of representatives from EPA, Health Canada, the California Department of Pesticide Regulation, and member companies of the American Crop Protection Association. It is a software system consisting of two parts – a database of measured exposure values for workers involved in the handling of pesticides under actual field conditions and a set of computer algorithms used to subset and statistically summarize the selected data. Currently, the database contains values for over 1,700 monitored individuals (i.e., replicates). The quality of the data and exposure factors represents the best sources of data currently available to the Agency for completing these kinds of assessments.

c. Occupational Handler Risk Estimates and Risk Characterization

Non-cancer risk estimates are expressed in terms of the Margin of Exposure (MOE), which is calculated by dividing the NOAEL by the dose. For occupationally exposed workers, MOEs greater than or equal to 100 do not exceed EPA's level of concern. Most of the mixer/loader MOEs for MCPA exceed the MOE level of concern of 100 with single layer PPE, and therefore are not of concern to the Agency. The MOE for mixing/loading liquids for aerial application to rangeland/pastures is acceptable at the MCPA Task Force rate of 2.0 lbs ae/acre with the addition of a PF5 respirator to single layer PPE. With the exception of the right-of-way (ROW) application, the MOEs for applicators are above 100 and are not of concern. The ROW applicator scenario requires double layer PPE with PF10 respirators to achieve an acceptable MOE. The MOEs for the mixer/loader/applicator and flagger scenarios are generally acceptable with single layer PPE. A summary of the risk estimates for baseline, PPE and engineering controls is presented in Table 18.

Table 18: MCPA Short/Intermediate Term MOEs for Occupational Handlers

Exposure Scenario	Crop or Site	Application Rate (lb/ae/acre)	Acres/Day	Base-line	Single Layer and Gloves	Single Layer PF5 and Gloves	Single Layer PF10 and Gloves	Double Layer PF10 and Gloves	Eng Control MOE and Gloves
Mixer/Loader (M/L)									
M/L WP for Groundboom	Golf Courses	2	40	19	76	240	330	380	5700
M/L Liquids for Aerial	Rangeland, Pastures	4	1200	0.5	29	51	57	72	140
	Rangeland, Pastures	2	1200	1.0	58	100	120	140	280
	Small Grains, Rice	1.5	1200	1.3	77	140	150	190	370
	Flax, Peas	0.375	1200	5.3	310	550	600	770	1500
M/L Liquids for Groundboom	Rangeland, Pastures	4	200	3	170	310	340	430	830
	Rangeland, Pastures	2	200	6	340	620	780	1400	4400
	All other Crops	0.375 to 1.5	200	≥8	≥460	≥820	≥910	≥1200	≥2200
	Golf Courses	2	40	30	1700	3100	3400	4300	8300
M/L Liquids for ROW Sprayer	Rights of Way	4	50	12	700	1200	1400	1700	3300
Load Granulars for Broadcast Spreader	Golf Courses	2	40	1900	1900	6000	8100	12000	36000
Applicator									
Aerial Application	All Crops Above	0.375 to 4.0	1200	ND	ND	ND	ND	ND	>220

Exposure Scenario	Crop or Site	Application Rate (lb/ae/acre)	Acres/ Day	Base-line	Single Layer and Gloves	Single Layer PF5 and Gloves	Single Layer PF10 and Gloves	Double Layer PF10 and Gloves	Eng Control MOE and Gloves
Groundboom Application	All Crops Above	0.375 to 4.0	40 to 200	>280	>280	>500	>560	>690	>1500
Rights of Way Application	Rights of Way	4	50	25	73	86	88	120	ND
Broadcast Spreader Application	Golf Courses	2	40	2400	2500	6900	8800	13000	12000
Mixer/Loader/Applicator (M/L/A)									
M/L/A Liquids with Backpack Sprayer	Spot Treatment	4	4	ND	160	170	170	270	ND
M/L/A Wettable Powder with Turfgun	Turf	2	5	ND	330	690	790	1300	1100
M/L/A Liquid Flowables with Turfgun	Turf	2	5	ND	1300	1400	1400	2600	ND
Load/Apply Granules with a Push Cyclone	Turf	2	5	ND	220	270	270	420	ND
Flagger									
Flag Aerial Application	Rangeland, Pastures	4	1200	77	73	110	110	120	3800
	Rangeland, Pasture	2	1200	150	150	220	220	240	7600
	All other Crops	0.375 to 1.5	1200	≥210	≥190	≥290	≥300	≥330	≥10000
Note - MOEs in bold font are below the MOE Level of Concern of 100, and therefore indicate risks of concern.									

d. Postapplication Occupational Risk

Postapplication exposures to MCPA can occur in the agricultural environment when workers enter fields recently treated with MCPA to conduct tasks such as scouting and irrigation. MCPA is typically applied once per season and the window of time in the growing season during which applications can be made is only a few weeks long. Therefore, it is anticipated that MCPA postapplication exposures would be primarily short-term and, more rarely, intermediate term.

Only dermal exposures were evaluated in the postapplication worker assessment. Postapplication inhalation exposures are not anticipated because of the low vapor pressure of MCPA (7.7×10^{-6} mbar at 20 °C). Postapplication oral exposures were not evaluated because the Agency currently has no policy or method for evaluating non-dietary oral ingestion by workers due to poor hygiene practices or smoking.

In the Worker Protection Standard, a restricted entry interval (REI) is defined as the duration of time which must elapse before residues decline to a level so entry into a previously treated area and engaging in any task or activity would not result in exposures which are of concern. Typically, the activity with the highest risk will drive the selection of the appropriate REI for the crop.

(1) Data Sources, Assumptions, and Transfer Coefficients

Data Sources

Data from three turf transferable residue studies submitted by the Broadleaf Turf Herbicide Task Force was used to estimate the risk to workers from the transfer of MCPA from treated turf. These studies are discussed in Section III.A.3.c.1 of this document and in the MCPA Revised Occupational and Residential Exposure and Risk Assessment, dated June 11, 2004.

With the exception of the turf transferable residue data, there were no chemical-specific data submitted to determine foliar transfer coefficients for MCPA. Therefore, the Dislodgeable Foliar Residue (DFR) was assumed to be 20% for all crops except turf. This is the standard value used in the absence of chemical specific data.

Assumptions

The following assumptions were made regarding postapplication occupational exposure.

- Risks were assessed using maximum label rates.
- The transfer coefficients, as listed in Table 19, are from an interim transfer coefficient policy developed by HED's Science Advisory Council for Exposure using proprietary data from the Agricultural Re-entry Task Force (ARTF) database (US EPA, August 7, 2001).
- The transfer coefficients for turf harvesting and maintenance are based upon recently submitted studies discussed above.
- The initial percent of application rate as Dislodgeable Foliar Residue (DFR) was assumed to be 20% for all crops except turf. These are the standard values used in the absence of chemical specific data.
- The Maximum TTR value (3.1 percent of the application rate) from the DMAS Treatment at the North Carolina Site was used to assess risks of working on turf in wet growing regions.
- The Maximum TTR value (1.6 percent of the application rate) from the DMAS Combination Treatment at the California Site was used to assess risks of working on turf in dry growing regions.

Transfer Coefficients

The exposure scenarios and corresponding transfer coefficients used in the occupational postapplication assessment are presented below, in Table 19.

Table 19: Post Application Exposure Scenarios and Transfer Coefficients for MCPA

Crop	Transfer Coefficient Group	Label Directions	Transfer Coefficient (cm ² /hr)
		Post Application Exposure Scenarios	
Flax	Field/row crop, low/medium	Apply when flax is 2 to 8 inches tall. Do not spray once flax has reached bud stage.	
		Low Exposure Scenarios - Irrigation, scouting, immature plants Medium Exposure Scenarios - Scouting mature plants	100 1500
Peas	Field/row crop, low/medium	Use only in the Pacific Northwest. Treat when peas are 4 to 6 inches tall.	
		Low Exposure Scenarios - Irrigation, scouting, immature plants	100
Rice	Field/row crop, low/medium	Make applications only when weeds are present and where rice is well established, 6 to 8 inches above water. Make applications no sooner than 35 and no later than 65 days after seeding or when crop stems begin to elongate. Water should not be less than 2 to 3 inches deep. Do not apply after the boot stage.	
		Low Exposure Scenarios - Scouting, immature plants Medium Exposure Scenarios - Scouting mature plants	100 1500
Small Grains	Field/row crop, low/medium	Apply after grain is fully tillered (4 to 8 inches high, but not forming joints in the stem). Do not apply in the boot to dough stage	
		Low Exposure Scenarios - Scouting, immature plants Medium Exposure Scenarios - Scouting mature plants	100 1500
Sorghum, Grain	Field/row crop, tall	Apply when sorghum is 6 to 12" tall but before the boot stage.	
		Low Exposure Scenarios - Scouting immature plants	100
Turf, Sod Farm and Golf Course	Turf/Sod	For optimum results, turf should not be mowed for 1 to 2 days after application	
		Low Exposure Scenarios - Mowing High Exposure Scenarios - Transplanting, hand weeding	3400 6800

(2) Occupational Postapplication Risk Estimates and Risk Characterization

The highest postapplication exposure risks are for small grains and rice when using the maximum label application rates. However, label language and usage information indicate that maximum rates are infrequently employed. The maximum label rate for small grains is used only for emergency control because it can damage the crop. The maximum label rate for rice is used when only one application is made as specified by a few of the labels. The remaining labels indicate that if two applications are needed, they should be made at one-half the maximum rate.

The Worker Protection Standard (WPS) Restricted Entry Interval (REI) for MCPA is 12 hours for the ester form and 48 hours for the amine and sodium salt forms. There is no REI for the acid form, because the acid form is used only on non-agricultural sites (such as lawns and golf courses) that are not covered in the WPS.

A summary of the occupational risks for short and intermediate term postapplication exposures is given in Table 20, below. All of the short/intermediate term MOEs are above 100 on Day 0 which indicates that the risks are not of concern.

Table 20: MCPA Postapplication Worker Risks

Crop	Transfer Coefficient Group	Short/Intermediate Term MOE on Day 0			
		Application Rate (lb ae/acre)	Low Exposure Scenarios*	Medium Exposure Scenarios*	High Exposure Scenarios*
Flax	Field/row crop, low/medium	0.375	10000	690	NA
Peas	Field/row crop, low/medium	0.375	10000	NA	NA
Small Grains, Rice	Field/row crop, low/medium	1.5	2600	170	NA
Sorghum	Field/row crop, tall	0.75	5200	1300	NA
Turf	Turf - California	2.0	720	NA	360
	Turf - North Carolina	2.0	380	NA	190
*Task descriptions for each crop and exposure scenario are provided in the ORE Chapter.					

e. Human Incident Data

Relatively few incidents of illness have been reported due to MCPA. Poison Control Center Data (1993 through 2001) indicated that there were relatively few exposures to products containing MCPA as the only active ingredient. Out of 28 reported exposures, 12 received follow-up to determine final medical outcome. Final medical outcome was none for three cases, minor for six, and moderate for three cases. Primary symptoms were dermal including one moderate case who reported bullae, erythema, and rash. The other two moderate cases reported difficulty breathing in one person and headache, eye irritation and

tearing in the other. This information suggests that MCPA can be a cause of irritative effects to skin, eyes, and respiratory tract. Similar symptoms of exposure to MCPA were seen in data from California (5 incidents related to MCPA for 1982 - 2002) and in the literature. A literature search showed one fatal case, characterized as a suicide, involving a 32 year-old male who intentionally ingested 440 mg/kg and died about 20 hours after the ingestion.

B. Environmental Risk Assessment

A summary of the Agency's environmental risk assessment is presented below. For detailed discussions of all aspects of the environmental risk assessment, see the Revised Environmental Fate and Effects Division Preliminary Risk Assessment for the 2-methyl-4-chlorophenoxyacetic acid (MCPA) Reregistration Eligibility Decision Document (hereafter, the Revised EFED RED Document for MCPA), dated April 14, 2004.

1. Environmental Fate and Transport

As discussed in Section II, four forms of MCPA are registered in the United States: acid, dimethylamine salt (DMAS), sodium salt, and 2-ethylhexyl ester (2-EHE). A detailed discussion of the environmental fate, transport, and physical-chemical properties and chemical structures of the four forms is provided in the Revised EFED RED Document for MCPA (dated April 14, 2004). For this assessment, EPA developed a bridging strategy based on the fact that MCPA DMAS, sodium salt, and 2-EHE rapidly convert to MCPA acid. Based on data submitted by the registrant that supported the bridging strategy, EPA determined that studies conducted with MCPA acid could provide surrogate data for the DMAS, sodium salt, and 2-EHE forms.

In general, MCPA acid is practically insoluble in water, non-volatile, somewhat lipophilic ($\log K_{ow}$ 2.8), and exists naturally as a solid. MCPA acid does not hydrolyze. MCPA photodegraded very slowly when applied to soil surfaces and irradiated with natural sunlight (half-life 67 days). In an aerobic soil metabolism study MCPA acid degraded with a half-life of 24 days. Under aerobic aquatic conditions, MCPA acid degraded with a total system half-life of >30 days in a water-sandy clay loam sediment systems. In laboratory batch equilibrium studies, MCPA acid was shown to be extremely mobile.

2. Water Resource Assessment

Water modeling was conducted to determine potential exposure to aquatic animals. The modeling results are summarized here. Refer to the Revised EFED RED Document for MCPA for an in-depth discussion of the water models.

a. Ground Water

The Agency does not use ground water modeling information to assess exposure to aquatic animals. Residues in surface water are almost always greater than residues in ground water and therefore use of surface water models is more protective.

b. Surface Water

The Agency used PRZM-EXAMS to calculate refined Estimated Environmental Concentrations (EECs) for MCPA. The Pesticide Root Zone Model (PRZM, versions 3.12 and 2.98.04) simulates pesticides in field runoff, while the Exposure Analysis Modeling System (EXAMS, version 2.97-5) simulates pesticide fate and transport in an aquatic environment (one hectare body of water, two meters deep). Eight different crop scenarios were modeled, including wheat in North Dakota and Oregon, peas in Oregon, sorghum in Kansas, and rangeland/pastureland in California, Pennsylvania, and Minnesota. The standard scenario for alfalfa was used to represent rangeland/pastureland in California, Pennsylvania, and Minnesota. The alfalfa scenario was chosen because its hydrologic and agronomic practices closely match those of pasture/rangeland for which an approved scenario has not been developed. An additional non-crop scenario was run for turf in Pennsylvania. Finally, a second set of rangeland/pasture scenarios were run using the MCPA Task Force-supported use rate of 2 lb ae/acre with 2 applications 30 days apart as opposed to a single application of 4 lbs ae/acre which can be found on currently registered labels. These scenarios were chosen to model the concentration of MCPA in surface drinking water over a geographically dispersed range of surface water concentrations in areas representative of heavy MCPA use (i.e. northern Great Plains and northwestern US).

Aquatic EECs for the ecological exposure to MCPA acid were estimated using PRZM 3.12/EXAMS 2.98 employing the small water body scenario, a Tier 2 screening model designed to estimate pesticide concentrations found in water at the edge of a treated field. As such, it provides high-end estimated values of the pesticide concentrations that might be found in ecologically sensitive environments following pesticide application. PRZM-EXAMS is a multi-year runoff model that also accounts for spray drift from multiple applications. In the ecological exposure assessment, PRZM-EXAMS simulates a 10 hectare (ha) field immediately adjacent to a one hectare small water body, 2 meters deep with no outlet. The location of the field is specific to the crop being simulated using site specific information on the soils, weather, cropping, and management factors associated with the scenario. The crop/location scenario is intended to represent a high-end exposure site on which the crop is normally grown. Based on historical rainfall patterns, the small water body receives multiple runoff events during the years simulated. The aquatic ecological exposure assessment relied on the same modeling scenarios as those used in the human health drinking water exposure assessment discussed above.

Acute risk assessments are performed using peak EEC values for single and multiple applications. Chronic risk assessments for invertebrates and fish are performed using the average 21-day and 60-day EECs, respectively. Table 21 presents the PRZM/EXAMS estimated exposure concentrations (EECs) of MCPA in surface water for the eight different crop scenarios.

Table 21: Estimated Environmental Concentrations (EECs)

Simulation Scenario			EEC (ug ae/L)		
Crop and Location	Application rate (ae/acre)	# Applications	1-in-10 year Peak	21 Day Average	60 Day Average
North Dakota wheat	1.5	1	11.68	5.38	2.72
Oregon wheat	1.5	1	9.94	5.54	2.57
California pasture	4	1	18.48	11.27	5.60
California pasture	2	2	14.60	8.64	5.48
Pennsylvania pasture	4	1	23.02	13.69	6.69
Pennsylvania pasture	2	2	21.14	12.52	6.53
Minnesota pasture	4	1	16.94	9.18	4.71
Minnesota pasture	2	2	22.35	10.74	5.27
Kansas sorghum	0.75	1	13.08	6.14	2.61
Oregon peas	0.375	1	4.12	2.53	1.18
Pennsylvania turf	2.0	1	5.69	2.88	1.36

3. Toxicity (Hazard) Assessment

a. Avian, Mammalian, and Non-target Insect Toxicity

Toxicity to Birds

Acute toxicity tests indicate that technical MCPA is “moderately toxic” to “practically non-toxic” to birds exposed for short periods based on the submitted studies for MCPA acid and MCPA DMAS. No adverse effects were demonstrated in the avian reproduction toxicity study submitted for MCPA acid.

The acute toxicity of technical grade MCPA to birds was established with two avian single-dose oral (LD₅₀) studies on the bobwhite quail using MCPA acid and MCPA DMAS and two sub-acute dietary studies (LC₅₀) on the mallard duck and the bobwhite quail using MCPA DMAS. No avian acute data were submitted for MCPA sodium salt or MCPA 2-EHE; these studies are not required based on the bridging strategy discussed in Section III.B.1. Avian acute toxicity summary data for MCPA are presented in Tables 22 and 23.

A single avian chronic exposure reproduction effects study was performed for MCPA using MCPA acid on bobwhite quail (Table 24). No negative effects were observed in this study; therefore, the NOAEC = 1000 mg ae/kg-diet (the highest dose tested) and the LOAEC was >1000 mg ae/kg-diet. No avian chronic data were submitted for MCPA sodium salt, MCPA DMAS, or MCPA 2-EHE; these studies are not required based on the bridging strategy discussed in Section III.B.1.

Table 22: Acute Toxicity to MCPA to Birds (oral gavage administration)

PC # a.i.	Species	% a.i.	LD ₅₀ , mg/kg-bw (conf. interval)		Toxicity Classification (based on a.e.)
			a.i.	a.e. ^a	
030501 - MCPA Acid	Bobwhite quail	94.6	377	377 (314, 452)	moderately toxic
030516 - MCPA DMAS Salt	Bobwhite quail	56.4	270 (173, 480)	221 (142, 394)	moderately toxic

^a Acid equivalency calculated as: 90.3% for MCPA sodium salt, 81.7% for MCPA DMAS, and 64.1% for MCPA 2-EHE.

Table 23: MCPA DMAS Salt Acute Toxicity to MCPA to Birds (dietary administration)

Species	% a.i.	LC ₅₀ , mg/kg-diet (conf. interval)		Toxicity Classification (based on a.e.)
		a.i.	a.e. ^a	
Bobwhite quail	56.4	>5620	>4608	practically non-toxic
Mallard duck	56.4	>5620	>4608	practically non-toxic

^a Acid equivalency calculated as: 90.3% for MCPA sodium salt, 81.7% for MCPA DMAS, and 64.1% for MCPA 2-EHE.

Table 24: MCPA Chronic Toxicity to MCPA to Birds

Species	% a.i.	NOAEC (mg/kg-diet)		LOAEC (mg/kg-diet)		Effects
		a.i.	a.e. ^a	a.i.	a.e.	
Bobwhite quail	94.22	1000	1000	>1000	>1000	None

^a Acid equivalency calculated as: 90.3% for MCPA sodium salt, 81.7% for MCPA DMAS, and 64.1% for MCPA 2-EHE.

Toxicity to Mammals

Available mammalian toxicity data on laboratory mammals was used to approximate toxicity to mammalian wildlife. The portion of that data used for calculating risk quotients is summarized in Table 25.

In general, toxicity tests indicate MCPA is “slightly toxic” to mammals exposed for short periods based on data submitted for MCPA acid, sodium salt, DMAS, and 2-EHE. The rat two-generation toxicity study was used for risk calculations. Adverse effects similar to those seen in the two-generation study were also demonstrated in mammalian subchronic and developmental studies. Detailed discussions of the mammalian toxicity profile for these and other studies can be found in the June 4, 2004, Revised Human Health Risk Assessment.

Table 25: Mammalian Toxicity Studies Used for RQ Calculations

Test Type	MCPA Form	% a.i.	NOAEC (mg/kg-diet)		LOAEC (mg/kg-diet)		Effects
			a.i.	a.e. ^a	a.i.	a.e.	
2-generation reproductive (rats)	MCPA Acid	94.8	parental=150 repro=150 offspring=450	parental=150 repro=150 offspring=450	parental=450 repro=450 offspring>450	parental=450 repro=450 offspring>450	Parental: Increased absolute and relative ovary wts (p<0.05; 23-25% greater than controls) Repro: decreased pup weight gain during lactation Offspring: none observed

Non-Target Insects

Guideline toxicity tests show that MCPA is “practically non-toxic” to honey bees (Table 26).

Table 26: Acute Contact Toxicity of MCPA to Non-target Insects

PC# and a.i.	Species	% a.i.	Toxicity endpoint		Toxicity classification (based on a.e.)
			a.i.	a.e. ^a	
030516 - MCPA DMAS Salt	Honey bee	63.42	LD ₅₀ > 25 : g/bee	LD ₅₀ > 21 : g/bee	practically non-toxic
030564 - MCPA 2-EHE	Honey bee	93.9	LD ₅₀ > 25 : g/bee	LD ₅₀ > 17 : g/bee	practically non-toxic

^a Acid equivalency calculated as: 90.3% for MCPA sodium salt, 81.7% for MCPA DMAS, and 64.1% for MCPA 2-EHE.

b. Toxicity to Aquatic Animals

For fish and invertebrates, most of the toxicity endpoints are within one order of magnitude when restricted to evaluating the MCPA acid, sodium salt and DMAS. The toxicity of MCPA 2-EHE tends to be two to three orders of magnitude greater than the toxicity of the acid and salts. EPA believes that the primary reason for the differences in the levels of toxicity between the ester formulation relative to the salts and acid is that esters have a greater affinity for uptake through cell wall membranes.

Toxicity to Freshwater Fish

No studies were submitted to the Agency evaluating toxicity of MCPA acid to freshwater fish. Toxicity studies using an end-use product for the sodium salt show that MCPA sodium salt is ‘slightly toxic’ to freshwater fish under acute exposure. Toxicity studies conducted using the technical and an end-use products (Rhomene) for MCPA DMAS demonstrate it is ‘slightly toxic’ to ‘practically non-toxic’ to freshwater fish under acute exposure. Toxicity tests show technical MCPA 2-EHE is ‘highly toxic’ to ‘moderately toxic’ to freshwater fish exposed for short periods of time.

Toxicity to Freshwater Invertebrates

No studies were submitted to the Agency evaluating toxicity of MCPA acid to freshwater invertebrates. A toxicity study using an end-use product for the sodium salt (Chiptox) shows that MCPA sodium salt is ‘practically non-toxic’ to freshwater invertebrates under acute exposure. Toxicity studies conducted using the technical product and an end-use product (Rhomene) for MCPA DMAS demonstrate it is ‘slightly toxic’ to ‘practically non-toxic’ to freshwater invertebrates under acute exposure. Toxicity tests show technical MCPA 2-EHE is ‘highly toxic’ to freshwater invertebrates exposed for short periods of time.

One invertebrate life-cycle toxicity study was conducted for MCPA DMAS. The study on daphnids indicated a NOAEC of 11 mg ae/L and a LOAEC of 22 mg ae/L with the most sensitive parameter of reproduction.

Toxicity to Estuarine/Marine Fish

A toxicity study conducted using the technical product for MCPA acid demonstrates it is ‘practically non-toxic’ to estuarine/marine fish under acute exposure. A toxicity study conducted using an end-use product (Chiptox) for MCPA sodium salt demonstrates that it is ‘practically non-toxic’ to estuarine/marine fish under acute exposure. Toxicity studies conducted using the technical product and an end-use product (Rhomene) for MCPA DMAS demonstrate it is ‘practically non-toxic’ to estuarine/marine fish under acute exposure. Toxicity tests show technical MCPA 2-EHE is ‘moderately toxic’ to estuarine/marine fish exposed for short periods of time.

No estuarine/marine fish chronic toxicity studies of MCPA acid, salts, or ester were submitted to the Agency.

Toxicity to Estuarine/Marine Invertebrates

Toxicity studies conducted using the technical for MCPA acid demonstrate it is ‘practically non-toxic’ to estuarine/marine invertebrates under acute exposure. Toxicity studies conducted using an end-use product (Chiptox) for MCPA sodium salt demonstrate that it is ‘slightly toxic’ to ‘moderately toxic’ to estuarine/marine invertebrates under acute exposure. Toxicity studies conducted using the technical and an end-use product (Rhomene) for MCPA DMAS demonstrate it is ‘moderately toxic’ to ‘practically non-toxic’ to estuarine/marine invertebrates under acute exposure. Toxicity tests show technical MCPA 2-EHE is ‘highly toxic’ to estuarine/marine invertebrates exposed for short periods of time.

No estuarine/marine invertebrate chronic toxicity studies of MCPA acid, salts, or ester were submitted to the Agency.

c. Toxicity to Plants

Toxicity to Terrestrial Plants

In general, toxicity tests demonstrate MCPA negatively impacts seedling emergence and vegetative vigor of terrestrial plants based on data submitted for MCPA acid, DMAS, and 2-EHE. Table 27, below, presents a summary of the endpoints used to assess risk to terrestrial plants.

Table 27: MCPA Toxicity to Terrestrial Plants

Organism Group	MCPA Form	Endpoint
Terrestrial monocots emergence	MCPA 2-EHE	0.010 EC ₂₅ , lbs ae/acre
Terrestrial dicots emergence	MCPA DMAS	0.005 EC ₂₅ , lbs ae/acre
Terrestrial monocots vegetative vigor	MCPA 2-EHE	0.038 EC ₂₅ , lbs ae/acre
Terrestrial dicots vegetative vigor	MCPA DMAS	0.004 EC ₂₅ , lbs ae/acre

MCPA acid adversely affects seedling emergence and vegetative vigor of both monocots and dicots. For seedling emergence, the most sensitive monocot was onion and the most sensitive dicot was cabbage. For vegetative vigor, the most sensitive monocot was onion and the most sensitive dicots were lettuce and turnip.

No terrestrial plant studies were submitted to the Agency for MCPA sodium salt.

MCPA DMAS adversely affects seedling emergence and vegetative vigor of both monocots and dicots. For seedling emergence, the most sensitive monocot was ryegrass. For seedling emergence, the most sensitive dicot was cabbage. For vegetative vigor, the most sensitive monocot was onion and the most sensitive dicot was radish.

MCPA 2-EHE adversely affects seedling emergence and vegetative vigor of both monocots and dicots. For seedling emergence, the most sensitive monocot was oat and the most sensitive dicot was cabbage. For vegetative vigor, the most sensitive monocot was onion and the most sensitive dicots were lettuce and radish.

Toxicity to Aquatic Plants

For MCPA acid, the EC₅₀ for the *Lemna gibba* (freshwater vascular plant) was 0.17 mg ae/L and the NOAEC was <0.014 mg ae/L. For the three species of freshwater non-vascular plants (i.e., *Selenastrum capricornutum*, *Navicula pelliculosa*, and *Anabaena flos-aquae*), the EC₅₀s ranged from 0.63 to 6.7 mg ae/L, and the NOAECs ranged from 0.0089 to 0.47 mg ae/L. For the estuarine/marine non-vascular plant (*Skeletonema costatum*), the EC₅₀ was 0.30 mg ae/L and the NOAEC was 0.015 mg ae/L.

No aquatic plant studies were submitted to the Agency for MCPA sodium salt.

For MCPA DMAS, the EC₅₀ for the *Lemna gibba* (freshwater vascular plant) was 0.21 mg ae/L and the NOAEC was <0.4 mg ae/L. For the three species of freshwater non-vascular plants (i.e., *Selenastrum capricornutum*, *Navicula pelliculosa*, and *Anabaena flos-aquae*), the EC₅₀s ranged from 0.16 to 99 mg

ae/L, and the NOAECs ranged from 0.005 to 10.4 mg ae/L. For the estuarine/marine non-vascular plant (*Skeletonema costatum*), the EC₅₀ ranged from 1.2 to mg ae/L and the NOAEC ranged from 0.028 to 2.4 mg ae/L.

Toxicity studies were also conducted using the technical for MCPA 2-EHE. For the *Lemna gibba* (freshwater vascular plant), the EC₅₀ was 0.02 mg ae/L and the NOAEC was 0.004 mg ae/L. For the three species of freshwater non-vascular plants (i.e., *Selenastrum capricornutum*, *Navicula pelliculosa*, and *Anabaena flos-aquae*), Tier II toxicity tests were conducted. The EC₅₀'s ranged from 0.17 mg ae/L to 1.3 mg ae/L, and the definitive NOAECs ranged from 0.0035 to 0.021 mg ae/L. For the estuarine/marine non-vascular plant (*Skeletonema costatum*), the EC₅₀ was 0.056 mg ae/L, and the NOAEC was <0.0019 mg ae/L.

4. Exposure and Risk Calculations

a. Levels of Concern

Risk characterization integrates the results of the exposure and ecotoxicity data to evaluate the likelihood of adverse ecological effects by using risk quotients (RQs). RQs are calculated by dividing exposure estimates by acute and chronic ecotoxicity values:

$$RQ = \text{EXPOSURE} / \text{TOXICITY}$$

RQs are then compared with OPP's levels of concern (LOCs). These LOCs are used by OPP to analyze 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. Risk presumptions, along with the corresponding LOCs are summarized in Table 28. The ecotoxicity test values (measurement endpoints) used in the acute and chronic risk quotients are derived from required studies.

Table 28: Risk Presumptions for Terrestrial and Aquatic Animals and Plants

Risk Presumption	LOC terrestrial animals	LOC aquatic animals	LOC Plants
Acute Risk There is potential for acute risk; regulatory action may be warranted in addition to restricted use classification	0.5	0.5	1
Acute Restricted Use There is potential for acute risk, but may be mitigated through restricted use classification	0.2	0.1	N/A
Acute Endangered Species Endangered species may be adversely affected; regulatory action may be warranted	0.1	0.05	1
Chronic Risk There is potential for chronic risk; regulatory action may be warranted	1	1	N/A

b. Exposure and Risk to Nontarget Terrestrial Animals

(1) Exposure to Birds and Mammals

Pesticide concentrations on terrestrial food items from spray applications are based on data by Hoerger and Kenaga (1972) as modified by Fletcher et al. (1994) that determined residue levels on various terrestrial items immediately following pesticide application in the field. Specifically, for every 1 lb ai/acre of application, the resulting maximum concentration on short grass is 240 ppm, on tall grass is 110 ppm, on broad-leaved plants/small insects is 135 ppm, and on seeds/large insects is 15 ppm. For every 1 lb ai/acre

of application, the resulting mean concentration on short grass is 85 ppm, on tall grass is 36 ppm, on broad-leaved plants/small insects is 45 ppm, and on seeds/large insects is 7 ppm. Pesticide concentrations on food items following multiple applications are predicted using a first-order residue decline method, OPP's "FATE5" model, which allows determination of residue dissipation over time incorporating degradation half-life.

Predicted maximum and mean EECs resulting from multiple applications are calculated from the FATE5 program. FATE5 estimates the highest one-day residue, based on the maximum or mean initial EEC from the first application, the total number of applications, interval between applications, and a first-order degradation rate, consistent with OPP policy. For MCPA, the registrant has submitted several studies under Guideline 860.1500 which allow the estimation of foliar residue half-lives. Half-lives for each study were estimated using non-linear regression with an exponential decay model and ranged from 1.6 to 5.8 days. The mean residue half-life was 3.0 days and the upper 90th confidence limit for the mean was 3.4 days. EPA will use the upper 90th confidence limit for the mean to calculate residue for multiple applications.

Birds and mammals may be exposed to granular pesticides when foraging for food or grit. They also may be exposed by other routes, such as by walking on exposed granules or drinking water contaminated by granules. The exposure to granules is estimated as milligrams ae per square foot of treated ground using the maximum application rate of 0.124 lbs ae/5000 sq. ft (EPA Label # 228-203).

(2) Avian Risk

In the avian acute dietary studies that were submitted to the Agency, no mortalities were observed. Therefore, RQs based on these dietary studies were not calculated to evaluate the potential acute risks (i.e., Acute Endangered, Acute Restricted Use, and Acute Risk) to birds because of a high, unquantified LC₅₀ (> 4608 mg ae/kg-diet). Negative effects were observed in the submitted studies (reduced feed consumption and body weight gain), and the NOAECs were established at 820 mg ae/kg-diet for the bobwhite quail and 461 mg ae/kg-diet for the mallard duck. Acute risk based on mortality in the dietary studies is low.

Since mortality was observed in the acute gavage studies, acute avian RQs were calculated using the acute gavage studies. The most sensitive LD₅₀ was 221 mg ae/kg-bw (MCPA DMAS for bobwhite quail, MRID 40019202). The RQ calculations for the maximum labeled application rate (4.0 lbs ae/acre), the maximum labeled application rate for wheat (1.5 lbs ae/acre), and the application rate of 2.0 lbs ae/acre/app with two applications 30 days apart are summarized in Table 29.

Assuming maximum application rates (4.0 lbs ae/acre either as a single or split application) and maximum residue levels for all weight classes and food stuffs, RQs range from 0.01 to 6.6. Assuming maximum application rates and predicted mean residues, RQs range from 0.01 to 2.33.

Assuming maximum application rates on wheat (1.5 lbs ae/acre) and maximum residue levels for all weight classes and food stuffs, the RQs range from 0.01 to 2.46. Assuming maximum application rates on wheat and predicted mean residues, the RQs range from <0.01 to 0.88.

Assuming maximum residue levels at the maximum application rate, no Chronic Risk LOCs were exceeded for short grass, tall grass, and broadleaf forage/small insects. RQs range from 0.1 to 1.00. Since there were no exceedances at the highest application rate, chronic RQs for lower application rates were not calculated for this assessment.

Table 29: Avian Acute Risk Quotient Summary (Predicted Mean Residues)

Food Type	Weight Class (g)	4 lbs ae/acre	2 lbs ae/acre/app, 2 apps 30 days apart	1.5 lbs ae/acre
short grass	20	2.33	1.16	0.88
	100	1.04	0.52	0.39
	1000	0.33	0.17	0.12
tall grass	20	0.99	0.49	0.37
	100	0.44	0.22	0.17
	1000	0.14	0.07	0.05
broadleaf forage, small insects	20	0.89	0.45	0.34
	100	0.40	0.20	0.1
	1000	0.13	0.06	0.05
seeds, pods	20	0.04	0.02	0.02
	100	0.02	0.01	0.01
	1000	0.01	<0.01	<0.01

RQ > 0.10 indicates an exceedance of Endangered Species Level of Concern (LOC)

RQ > 0.20 indicates an exceedance of Acute Restricted Use LOC.

RQ > 0.50 indicates an exceedance of Acute Risk LOC.

Assuming maximum granular application rates (1.09 lbs ae/acre), there were no LOC exceedances as all calculated RQs were < 0.01. EPA does not currently assess chronic risks to birds from granular applications.

(3) Risk to Mammals

To evaluate the acute risk to mammals, RQs were calculated using the minimum LD₅₀ obtained from the acute oral studies (1383 mg ae/kg-bwt, MCPA acid, Acc. 21972) at the maximum labeled rate (4 lbs ae/acre) the maximum labeled application rate for wheat (1.5 lbs ae/acre), and the application rate of 2.0 lbs ae/acre with 2 applications 30 days apart. To evaluate the chronic risk to mammals, RQs were calculated using the NOAEC obtained from the 2-generation rat study with MCPA acid (NOAEC=150 mg ae/kg-diet, MRID 400417-01). The RQ values calculated at predicted mean residues are summarized in Tables 30 and 31.

Assuming maximum residue levels at the maximum single application rate (4.0 lbs ae/acre) for all weight classes and food stuffs, acute RQs ranged from < 0.01 to 0.63. Assuming predicted mean residue levels at the maximum single application rate, the acute RQs ranged from < 0.01 to 0.22. Assuming maximum residue levels at the application scenario of 2.0 lbs ae/acre/app for two applications 30 days apart for all weight classes and food stuffs, acute RQs ranged from 0.32 to < 0.01. Assuming mean residue levels, the RQs range from < 0.01 to 0.11. Assuming maximum residue levels at the maximum single application rate for wheat (1.5 lbs ae/acre) for all weight classes and food stuffs, acute RQs ranged from < 0.01 to 0.24. Assuming mean residues, RQs ranged from < 0.01 to 0.08.

Assuming the maximum labeled application rate (4.0 lbs ae/acre) and maximum residue levels for all weight classes and food stuffs, chronic RQs ranged from 0.40 to 6.40. Assuming mean predicted residues, the chronic RQs ranged from 0.19 to 2.27. Assuming maximum residue levels at the application scenario of 2.0 lbs ae/acre/app for two applications 30 days apart for all weight classes and food stuffs, the chronic RQs range from 0.20 to 3.21. Assuming mean residues, RQs range from 0.09 to 1.13. Assuming the maximum labeled application rate for wheat (1.5 lbs ae/acre) for maximum residue levels for all weight classes and food stuffs, the chronic RQs range from 0.15 to 2.40. Assuming mean residues, chronic RQs range from 0.07 to 0.85.

Table 30: Mammalian Acute Risk Quotient Summary (Predicted Mean Residues)

Food type	Weight class (g)	4 lbs ae/acre	2 lbs ae/acre/app, 2 apps 30 days apart	1.5 lbs ae/acre
short grass	15	0.22	0.11	0.08
	35	0.15	0.08	0.06
	1000	0.04	0.02	0.01
tall grass	15	0.09	0.05	0.04
	35	0.07	0.03	0.02
	1000	0.02	0.01	0.01
broadleaf forage, small insects	15	0.09	0.04	0.03
	35	0.06	0.03	0.02
	1000	0.01	0.01	0.01
seeds, pods	15	<0.01	<0.01	<0.01
	35	<0.01	<0.01	<0.01
	1000	<0.01	<0.01	<0.01

RQ > 0.10 indicates an exceedance of Endangered Species Level of Concern (LOC)

RQ > 0.20 indicates an exceedance of Acute Restricted Use LOC

RQ > 0.50 indicates an exceedance of Acute Risk LOC

Table 31: Mammalian Chronic Risk Quotient Summary (Predicted Mean Residues)

Food type	4 lbs ae/acre	2 lbs ae/acre/app, 2 apps 30 days apart	1.5 lbs ae/acre
short grass	2.27	1.13+	0.85
tall grass	0.96	0.48	0.36

Food type	4 lbs ae/acre	2 lbs ae/acre/app, 2 apps 30 days apart	1.5 lbs ae/acre
broadleaf forage, small insects	1.20+	0.60	0.45
fruit, large insects, seeds, pods	0.19	0.09	0.07

RQ > 1.0 indicates an exceedance of Chronic LOC

Assuming maximum granular application rates (1.09 lbs ae/acre) there were no LOC exceedances as all calculated RQs were < 0.01. OPP does not currently assess chronic risks to mammals from granular applications.

(4) Risk to Insects

OPP currently does not quantify risks to terrestrial non-target insects; therefore, risk quotients are not calculated for these organisms. Since MCPA is practically non-toxic to honey bees (LD50 of >17 ug/bee), the potential for MCPA to have adverse effects on pollinators and other beneficial insects is low.

5. Exposure and Risk to Nontarget Aquatic Animals

Risks to aquatic fish and invertebrates were assessed using modeling with PRZM/EXAMS to estimate aquatic exposure due to runoff and spray drift. Overall, drift was a minor component when compared to runoff. The assessment of runoff and spray drift of MCPA acid and amine salts, showed no exceedances of any LOC for aquatic fish and invertebrates.

For MCPA ester assessment of runoff with spray drift, there were mixed exceedances of endangered species LOC with RQs ranging from 0.05 to 0.07 for freshwater invertebrates for the North Dakota wheat, Oregon wheat, Pennsylvania pasture, and Minnesota pasture scenarios.

a. Exposure and Risk to Nontarget Plants

(1) Risk to Terrestrial Plants

For terrestrial plants, an analysis of the results indicates exceedance of the Acute Risk LOC and the Acute Endangered Species LOC for all modeled scenarios at the highest application rate (Table 32, below). At the highest labeled rate for wheat (1.5 lbs ae/acre), all Acute Endangered Species LOCs were exceeded, and all Acute Non-endangered Species LOCs were exceeded except for drift to non-target monocots from ground application. At the highest labeled rate for granular applications (1.09 lbs ae/acre), all Acute Endangered Species LOCs and all Acute Non-endangered Species LOCs were exceeded.

Currently, OPP does not perform chronic risk assessments for terrestrial plants.

Table 32: Summarized Terrestrial Plant Risk Quotients

Scenario (Appl. rate)	Plant Type	Acute Non-endangered RQs			Acute Endangered RQs		
		adjacent to treated sites	semi-aquatic areas	drift	adjacent to treated sites	semi-aquatic areas	drift
Ground spray application (4.0 lbs ae/acre)	Monocot	24.00	204.00	1.05	40.00	340.00	3.08
	Dicot	48.00	408.00	10.00	40.00	340.00	13.33
Aerial or chemigation spray application (4.0 lbs ae/acre)	Monocot	32.00	140.00	5.26	53.33	233.33	15.38
	Dicot	64.00	280.00	50.00	53.33	233.33	66.67
Ground spray application (1.5 lbs ae/acre)	Monocot	9.00	76.50	0.39	15.00	127.50	1.15
	Dicot	18.00	153.00	3.75	15.00	127.50	5.00
Aerial or chemigation spray application (1.5 lbs ae/acre)	Monocot	12.00	52.50	1.97	20.00	87.50	5.77
	Dicot	24.00	105.00	18.75	20.00	87.50	25.00
Granular ground application (1.09 lbs ae/acre) ^a	Monocot	5.45	54.50	NA	9.08	90.83	NA
	Dicot	10.90	109.00	NA	9.08	90.83	NA

^a RQs for ground granular applications in this table were calculated for the maximum labeled application rate of 1.09 lbs ae/acre. RQs for other application rates are a linear function of the listed RQs. Drift RQs are not applicable for granular applications.

(2) Risk to Aquatic Plants

Similar to aquatic organisms, risks to aquatic plants were assessed using modeling with PRZM/EXAMS to estimate aquatic exposure due to runoff with spray drift of MCPA acid, amine salts and ester.

For the first scenario, assessment of runoff with spray drift of MCPA acid and amine salts, there were no exceedances of any LOC for the non-endangered plants. However, there were exceedances of the acute endangered freshwater vascular plant for several scenarios, as presented in Table 33, below.

Table 33: Endangered Species Aquatic Plants exposed to MCPA acid and amine salts via runoff and drift

Scenario	Rate	RQ
CA pasture	One application at 4.0 lbs/acre	1.42
CA pasture	Two applications at 2.0 lbs/acre	1.12
PA pasture	One application at 4.0 lbs/acre	1.77
PA pasture	Two applications at 2.0 lbs/acre	1.62

Scenario	Rate	RQ
MN pasture	One application at 4.0 lbs/acre	1.30
MN pasture	Two applications at 2.0 lbs/acre	1.72
KS sorghum	One application at 0.75 lbs/acre	1.01
Rice	One application at 1.25 lbs/acre	94

For the second scenario, assessment of runoff with spray drift of the MCPA ester, there were no exceedances of any LOC for the non-endangered plants. However, there were exceedances of the acute endangered freshwater vascular plant for several scenarios, as presented in Table 34, below.

Table 34: Endangered Species Aquatic Plants exposed to MCPA ester via runoff and drift

Scenario	Rate	RQ
ND wheat	One application at 1.5 lbs/acre	3.18
OR wheat	One application at 1.5 lbs/acre	2.43
CA pasture	Two applications at 2.35 lbs/acre	1.65
PA pasture	One application at 2.35 lbs/acre	2.90
PA pasture	Two applications at 1.315 lbs/acre	1.45
MN pasture	One application at 2.35 lbs/acre	2.25
MN pasture	Two applications at 1.315 lbs/acre	1.13
PA turf	One application at 1.75 lbs/acre	1.40

6. Ecological Incidents

There are several reported incidents in the Environmental Incident Information System (EIIIS) database with a terrestrial organism effect. All were crop injury incidents. There are no reported incidents involving the use of MCPA alone, with the exception of the accidental misuse. All other reported incidents involve co-formulated products in which the damage may have been caused by MCPA and/or the other active ingredients in the products.

In North Dakota, Bronate Advanced, co-formulated with MCPA 2-EHE, bromoxynil octanoate, and bromoxynil heptanoate, was reported to have damaged 880 acres of spring wheat when applied in 2002 (#I013430-023, I013430-024, I013103-029). In North Dakota, DAKOTA, co-formulated with MCPA 2-EHE and fenoxaprop-p-ethyl, was reported to have damaged 150 acres of spring wheat when applied in 2000 (#I010472-093).

In Canada, Curtail, co-formulated with MCPA 2-EHE and clopyralid, is alleged to have caused crop injury to 20,000 acres of peas, chick peas, and lentils planted in 2002. This was reported as a carry-over injury as Curtail had been applied to barley, oats, and wheat that were grown in those fields in 2001 (#I013636-008).

In Wisconsin, MCPA AMINE 4, formulated with MCPA DMAS, was reported to have killed 28.8 acres of alfalfa and oats when applied in excess of the labeled application rate in 2001 (#I012242-001).

7. Endangered Species

The Agency has developed the Endangered Species Protection Program to identify pesticides whose use may cause adverse impacts on endangered and threatened species, and to implement mitigation measures that address these impacts. The Endangered Species Act requires federal agencies to ensure that their actions are not likely to jeopardize listed species or adversely modify designated critical habitat. To analyze the potential of registered pesticide uses to affect any particular species, EPA puts basic toxicity and exposure data developed for reregistration eligibility decisions into context for individual listed species and their locations by evaluating important ecological parameters, pesticide use information, the geographic relationship between specific pesticide uses and species locations and biological requirements and behavioral aspects of the particular species. A determination that there is a likelihood of potential impact to a listed species may result in limitations on use of the pesticide, other measures to mitigate any potential impact, or consultations with the Fish and Wildlife Service and/or the National Marine Fisheries Service as necessary.

Based on EPA's screening level assessment, RQs exceed levels of concern for MCPA use sites for endangered species of mammals, birds, aquatic plants, and terrestrial plants. These findings are based solely on EPA's screening level assessment and do not constitute "may affect" findings under the Endangered Species Act. The Agency is requiring application rate reductions and additional mitigation to minimize these LOC exceedances, and is requiring additional data to further characterize and refine its ecological and endangered species risk assessments.

8. Risk Characterization

a. Terrestrial Animal Risk Characterization

Using the acute dietary bird toxicity studies, risks for acute lethal concerns to birds are low, as no mortality was observed at the highest dose. However, based on the acute toxicity studies submitted for birds, there is a large differential between the acute toxicity when MCPA is administered as a single gavage or when mixed in the feed. This disparity in mortality between the two studies suggests that the dietary matrix may have a lowering effect of the toxicity of MCPA. Although the concerns for lethality of MCPA to non-endangered birds is minimal, it is likely that the current maximum label rates could have adverse non-lethal effects on birds, especially those consuming short grasses. Risks to endangered bird species including sublethal effects and lethal effects still exist due to the uncertainty in variability among species sensitivities. These risks would be greatest in short grass consumers, primarily smaller birds. Risk of adverse chronic effects to birds is not expected.

Although there were exceedances of the acute LOCs for mammals using predicted maximum residue levels and predicted mean residue levels at the maximum application rates, the risk assessment and calculated RQs assume 100% of the diet is relegated to single food types foraged only from treated fields. The assumption of 100% diet from a single food type may be somewhat more realistic for acute exposures, but

diets are likely to be more variable over longer periods of time depending on size and forage range of the animals.

Other exposure routes are possible for animals residing in or moving through treated areas. These routes include ingestion of contaminated drinking water, ingestion of contaminated soils, preening/grooming, and dermal contact. Preening exposures, involving the oral ingestion of material from the feathers remains an unquantified, but potentially important, exposure route. If toxicity is expected through any of these other routes of exposure, then the risks of a toxic response to MCPA is underestimated in this risk assessment.

b. Aquatic Organism Risk Characterization

The predicted peak MCPA acid concentrations based on the PRZM/EXAMS model for the ecological risk assessment are comparable to the highest annual maximum concentration of MCPA acid (18.58 $\mu\text{g ae/L}$) in the surface water monitoring data from NAWQA. The predicted PRZM/EXAMS chronic MCPA acid concentrations (21-day and 60-day average concentrations) are comparable to the maximum time-weighted mean concentration of MCPA acid (1.49 $\mu\text{g ae/L}$) of the surface water monitoring data from NAWQA. Although the monitoring results support the modeling estimates, it is important to note that none of the monitoring data was targeted to MCPA usage and no degradates of MCPA are included in the data that were evaluated.

Of the formulations for which toxicity data are available, the salts and acid form of MCPA ranged from ‘practically non-toxic’ to ‘moderately’ toxic to fish and invertebrates. MCPA 2-EHE was ‘moderately toxic’ to ‘highly toxic’ to fish and invertebrates.

Although toxicity categories for the salts and acid form of MCPA ranged from practically non-toxic to highly toxic, no Acute Risk LOCs were exceeded under any of the modeled scenarios.

Toxicity data for MCPA EHE ranged from ‘moderately toxic’ to ‘highly toxic’ to fish and invertebrates. The Endangered Species LOC for estuarine invertebrates in the California and the Pennsylvania pasture (single application) scenarios was exceeded in the scenarios modeling MCPA 2-EHE reaching the water body through drift only in the ester form. However, at this time there are no federally listed endangered estuarine or marine invertebrates.

However, for scenarios when MCPA 2-EHE is applied and it is assumed that the substance reaches the water in the 2-EHE form through both runoff and drift, there were several exceedances of the Endangered Species LOC for freshwater and estuarine invertebrates. Since there are no federally listed endangered estuarine/marine invertebrates, The Agency does not have concerns for these Endangered Species LOC exceedances at the present time. However, if MCPA 2-EHE does reach waterbodies through both runoff and drift, several Endangered Species screening level LOC exceedances could occur for freshwater invertebrates.

Based on the available information for MCPA, chronic risks to freshwater fish and invertebrates are low. OPP inferred that chronic risks to estuarine/marine fish and invertebrates would also be low under the

assumption that the acute-to-chronic ratio of toxicity endpoints would hold constant across freshwater and estuarine/marine organisms.

There are several uncertainties inherent in the aquatic organism risk assessment. Some of these uncertainties could lead to underestimates of risk, while others could lead to overestimates of risk. These and other uncertainties are discussed fully in the Revised EFED MCPA RED Document (dated April 14, 2004). One notable uncertainty is that this assessment accounts only for exposure of aquatic organisms to MCPA, but not to its degradates. The potential toxicity of degradates of MCPA is unknown.

c. Terrestrial and Aquatic Plant Risk Characterization

Risks to Terrestrial Plants

The risk quotient calculations suggest concern for non-target terrestrial plants across all use sites at the highest application rate (4.0 lbs ae/acre); the Acute Endangered Terrestrial Plant RQs and the Acute Non-Endangered Terrestrial Plant RQs exceeded the LOC for all the modeled scenarios. At the highest labeled rate for wheat (1.5 lbs ae/acre), the Acute Endangered LOCs and Acute Non-endangered LOCs were exceeded for all except for drift to non-target non-endangered monocots from ground application.

For MCPA, a total of 60 terrestrial plant studies were submitted using various formulations and species. Typically, The Agency evaluates risk to non-target terrestrial plants using the EC₂₅s for the most sensitive species tested from the seedling emergence studies and from the vegetative vigor studies. In order to test the conservativeness of this approach, The Agency evaluated the full range of EC₂₅ results. The 52 definitive EC₂₅s obtained in all the terrestrial plant studies ranged from 0.004 lb ae/acre to 2.0 lbs ae/acre.

If the 75th percentile of the definitive EC₂₅s (0.096 lbs ae/acre) is used as the toxicity endpoint, to calculate non-endangered non-granular RQs, all RQs (range from 2.50 to 21.25) exceeded an LOC of 1.0 for adjacent terrestrial and semi-aquatic non-target plants at an application rate of 4.0 lbs ae/acre. For drift from ground spray, the RQ for non-target plants was 0.42 and for drift from aerial application, the RQ for non-target plants was 2.08. This indicates that although there is a range of plant sensitivities to MCPA, a majority of the tested species have a high sensitivity to MCPA; therefore, this assessment for terrestrial plants is not overly conservative.

MCPA uptake is primarily through the foliage and it is translocated throughout the plant in the xylem and phloem. Uptake also occurs through the roots. Even if only a small surface area of the plant is exposed to MCPA, or a seedling is exposed to MCPA as it breaks through the soil surface, there is a possibility that the plant may be severely damaged or die as a result. The resulting damage, even if only minor, may be sufficient to prevent the plant from competing successfully with other plants for resources and water.

Spray drift is also an important factor in characterizing the risk of MCPA to non-target plants. There is as much as a 5-fold increase in the RQs when aerial application is used as opposed to ground application.

Concerns have also been raised regarding the higher volatility of the phenoxy esters, relative to the phenoxy amine salts, as this may increase off-target damage to plants through volatilization and subsequent drift. Only four of the EC₂₅s and 13 of the NOAECs from the 60 available plant (seedling and vegetative vigor) studies for all formulations of MCPA were less than 0.009 lbs ae/acre, indicating volatilization alone is not a major factor in non-target plant exposure to MCPA 2-EHE.

The risk assessment for terrestrial plants was based on RQs calculated from toxicity studies using the technical grade of MCPA acid, salt, and esters instead of TEPs (typical end-use product). Often the TEPs include surfactants or adjuvants to increase the herbicide's adsorption into the plant, thereby increasing its efficacy. If the toxicity tests were conducted using a TEP of MCPA at the same rates as the technical grade, the toxicity endpoints are likely to be much lower.

Risks to Aquatic Plants

There were no acute risk exceedances for aquatic plants. However, several exceedances of the Endangered Species LOC (freshwater vascular plants only) occurred under the different modeling scenarios. As with the invertebrates, these RQs were calculated using the maximum labeled application rates. However, for many crops, the average application rate is much lower than the maximum labeled rate. For the 2-EHE drift/runoff modeling, the RQs for freshwater vascular endangered plants are below the Acute Endangered LOCs at an application rates of 0.47 lbs ae/acre/yr for wheat, 0.81 lbs ae/acre/yr for pasture, and 1.25 lbs ae/acre/yr for turf. The average application rates for wheat and pasture are 0.37 and 0.39 lbs ae/acre/yr. For the 2-EHE drift only modeling, when the pasture and wheat application rates were modeled at a single application of 1.4 lbs ae/acre/yr the RQs for freshwater vascular aquatic plants were below the Endangered Species LOC.

All the toxicity endpoints on which the RQs were based were estimated from studies in which the technical form of MCPA was used. Often in many end-use products, surfactants and adjuvants are added to increase the effect of the active ingredient. If end-use products containing MCPA also contain these performance-enhancing inert ingredients and these inerts also reach the non-target aquatic plant species, this quantitative risk assessment may underestimate the risks.

IV. Risk Management, Reregistration and Tolerance Reassessment

A. Determination of Reregistration Eligibility

Section 4(g)(2)(A) of FIFRA calls for the Agency to determine, after submission of relevant data concerning an active ingredient, whether or not products containing the active ingredient are eligible for reregistration. The Agency has previously identified and required the submission of the generic (i.e., active ingredient-specific) data required to support reregistration of products containing the active ingredient MCPA.

The Agency has completed its assessment of the dietary, occupational, residential, and ecological risk associated with the use of pesticide products containing the active ingredient MCPA. Based on a review of these data and on public comments on the Agency's assessments for the active ingredient MCPA, EPA has sufficient information on the human health and ecological effects of MCPA to make decisions as part of the tolerance reassessment process under FFDCA and reregistration process under FIFRA, as amended by FQPA. The Agency has determined that MCPA products are eligible for reregistration provided that: (i) current data gaps and confirmatory data needs are addressed; (ii) the risk reduction measures outlined in this document are adopted; and (iii) label amendments are made to reflect these measures. Label changes are described in Section V. Appendix A summarizes the uses of MCPA that are eligible for reregistration. Appendix B identifies the generic data requirements that the Agency reviewed as part of its determination of reregistration eligibility of MCPA, and lists the submitted studies that the Agency found acceptable. Data gaps are identified as generic data requirements that have not been satisfied with acceptable data.

Based on its evaluation of MCPA, the Agency has determined that MCPA products, unless labeled and used as specified in this document, would present risks inconsistent with FIFRA. Accordingly, should a registrant fail to implement any of the risk mitigation measures identified in this document, the Agency may take regulatory action to address the risk concerns from use of MCPA. If all changes outlined in this document are incorporated into the product labels, then all current risks for MCPA will be adequately mitigated for the purposes of this determination.

B. Public Comments and Responses

When making its reregistration decision, the Agency took into account all comments received after the opening of the public docket. Three such comments were received, from the California Regional Water Quality Control Board, the National Barley Growers Association, and a private citizen. These comments are available, in their entirety, from the docket (Docket # OPP-2004-0156).

The California Regional Water Quality Control Board's comments recommended that EPA conduct a cumulative ecological risk assessment for phenoxy herbicides. At this time, however, OPP does not have a process for quantitatively assessing the cumulative ecological effects of pesticides; the best available science lacks the supporting data toxicity and exposure tools to conduct cumulative assessments for pesticides in the ambient environment.

The National Barley Growers Association's comments were in support of the reregistration of MCPA, specifically noting the importance of the pesticide's use on barley.

EPA did not receive formal comments from the registrants during the public comment period. However, EPA's response to the comments received from the MCPA Task Force Three during the 30-day registrant error-only correction period are available in the public docket (Docket # OPP-2004-0156).

C. Regulatory Position

1. FQPA Assessment

a. “Risk Cup” Determination

As part of the FQPA tolerance reassessment process, EPA assessed the risks associated with MCPA. EPA has determined that risk from dietary (food sources only) exposure to MCPA is within its own “risk cup.” An aggregate assessment was conducted for exposures through food, drinking water, and residential uses. The Agency has determined that the human health risks from these combined exposures are within acceptable levels. In other words, EPA has concluded that the tolerances for MCPA meet the FQPA safety standards. In reaching this determination, EPA has considered the available information on the special sensitivity of infants and children, as well as the chronic and acute food exposures. In addition, this determination is based on a revised database uncertainty factor analysis (described below in Section IV.C.1.c), in addition to a new dermal absorption study (see Section IV.D) and lower application rates.

b. Determination of Safety for U.S. Population

EPA has determined that the established tolerances for MCPA, with amendments and changes as specified in this document, meet the safety standards under the FQPA amendments to section 408(b)(2)(D) of the FFDCA, that there is a reasonable certainty of no harm for the general population. In reaching this determination, EPA has considered all available information on the toxicity, use practices and scenarios, and the environmental behavior of MCPA. As discussed in chapter 3, the total acute dietary (food alone) risk from MCPA is below the level of concern as is the chronic risk from food alone. Risks from drinking water exposures are also not of concern. Risks from residential and occupational exposures are also not of concern based on rate reduction and other mitigation measures, as well as a reassessment of the appropriate database uncertainty factor, as described below, and a new dermal absorption study. (See also additional discussion in Section IV.D.1 of this document [Regulatory Rationale, Human Health Risk Mitigation].)

c. Determination of Safety for Infants and Children

EPA has determined that the established tolerances for MCPA, with amendments and changes as specified in this document, meet the safety standards under the FQPA amendments to section 408(b)(2)(C) of the FFDCA, that there is a reasonable certainty of no harm for infants and children. The safety determination for infants and children considers the factors noted above for the general population, but also takes into account the possibility of increased dietary exposure due to the specific consumption patterns of infants and children, as well as the possibility of increased susceptibility to the toxic effects of MCPA residues in this population subgroup.

FQPA directs EPA, in setting pesticide tolerances, to use an additional tenfold margin of safety to protect infants and children, taking into account the potential for pre- and postnatal toxicity and the completeness of the toxicology and exposure databases. The statute authorizes EPA to replace this tenfold FQPA safety

factor with a different FQPA factor only if reliable data demonstrate that the resulting level of exposure would be safe for infants and children.

FQPA Special Safety Factor

In determining whether infants and children are particularly susceptible to toxic effects from MCPA residues, EPA considered the completeness of the database for developmental and reproductive effects, the nature of the effects observed, and other information. The FQPA Safety Factor for protection of children and infants was removed for two reasons: (1) there are acceptable developmental and reproduction studies that have been submitted and reviewed; and (2) there is no evidence of increased pre- or post-natal susceptibility except in a rat developmental toxicity study with MCPA 2-EHE.

OPP performed a Degree of Concern Analysis because there was evidence of increased susceptibility of the young following exposure to MCPA 2-EHE in a rat developmental study. After consideration of the study design, the Agency concluded that qualitative susceptibility was demonstrated because increased incidence of decreased fetal body weight, altered growth, and increased litter resorption were found at doses where maternal toxicity (decreased body weight gain) was also found. However, OPP characterized the degree of concern for the effects in this study as low, based on consideration of the doses and endpoints selected for risk assessment and the overall toxicity profile for MCPA. OPP further noted that the developmental study was well-conducted, that clear NOAELs/LOAELs were established, that the dose response for the observed effects is well characterized, and that the developmental NOAEL of 40 mg/kg/day identified in the study was used to establish the acute Reference Dose (aRfD) for the Females 13-50 population subgroup. Based on all of these considerations, the Agency concluded that the default Special FQPA Safety Factor is not required.

Database Uncertainty Factor

The Agency has concluded that a developmental neurotoxicity study on MCPA 2-EHE is necessary to further characterize the potential for pre-natal neurotoxicity due to the presence of clinical signs indicative of neurotoxicity in acute and subchronic studies. The MCPA toxicology database does not include a DNT study, and therefore a Database Uncertainty Factor is necessary to be protective of children. This Uncertainty Factor is applied only to exposure scenarios that are expected for children or pregnant women, and thus is not applied to occupational exposure scenarios.

Subsequent to public release of the revised risk assessment for MCPA, the Agency reevaluated the appropriate size of the Database Uncertainty Factor. The NOAEL from an acceptable reproduction study was compared to a dose level that the Agency assumes would be the NOAEL from a DNT study, when completed. The Agency has assumed that if a DNT study were conducted, the NOAEL from that study would be similar to the lowest dose tested in the reproduction study. The assumption is based on an analysis of data from DNT studies previously submitted to the Agency which suggests that NOAELs lower than the lowest dose tested in the reproduction study are unlikely to occur.

In the case of MCPA, the lowest dose tested in the rat reproduction study (MRID 40041701) is 2.5 mg/kg/day. The Agency therefore assumes that a DNT study on MCPA would yield a NOAEL of approximately 2.5 mg/kg/day. EPA's determination of the size of the Uncertainty Factor is based on a comparison between the assumed DNT NOAEL of 2.5 mg/kg/day and the endpoints used in the risk assessments. The approximate size of the Database Uncertainty Factor is derived by dividing the point of departure used for each exposure pathway by the assumed DNT NOAEL of 2.5 mg/kg/day.

Applying this dose analysis to MCPA, a 10X Database Uncertainty Factor is required for acute dietary scenarios (including acute incidental oral exposure), based on a comparison between the developmental NOAEL of 40 mg/kg/day and the assumed DNT study NOAEL of 2.5 mg/kg/day. A 10X Database Uncertainty Factor is also required for acute residential dermal scenarios, based on a comparison between the oral equivalent NOAEL of 40-50 mg/kg/day and the assumed DNT study NOAEL of 2.5 mg/kg/day. A 3X Database Uncertainty Factor is required for residential short-term and intermediate dermal exposure scenarios, based on a comparison between an oral equivalent NOAEL of 7 mg/kg/day and the assumed DNT study NOAEL of 2.5 mg/kg/day. The Agency has determined that a 1X Database Uncertainty Factor is appropriate for chronic dietary exposure, incidental oral exposure, long term dermal exposure, short- and intermediate-term occupational dermal exposures, and all durations of inhalation exposure because the endpoints used for these assessments, a NOAEL of 4.4 mg/kg/day, is of the same order of magnitude of the assumed DNT study NOAEL (2.5 mg/kg/day) and in a similar dose range. Table 35, below, summarizes the revised Database Uncertainty Factors for MCPA.

The Agency believes that with the application of the Database Uncertainty Factors discussed in this section, the regulatory endpoints are protective of children despite the need for a developmental neurotoxicity study. EPA is, however, still requiring the registrants to conduct a DNT study on the MCPA 2-EHE as a condition of reregistration. Results from this study will allow EPA to further characterize the potential for pre-natal neurotoxicity from the MCPA 2-EHE formulation.

Table 35: Summary of MCPA Revised Database Uncertainty Factors

Exposure Scenario	Previous Database Uncertainty Factor	New Database Uncertainty Factor
Acute Dietary	10X	10X
Chronic Dietary	10X	1X
Acute Incidental Oral	10X	10X*
Short-term Incidental Oral	10X	1X
Acute Dermal	Residential = 10X Occupational = 1X	Residential = 10X* Occupational = 1X
Short- and Intermediate-term Dermal	Residential = 10X Occupational = 1X	Residential = 3X Occupational = 1X
Inhalation (short-, intermediate-, & long-term)	Residential = 10X Occupational = 1X	1X
* The Database Uncertainty Factor is 10X because the endpoint used is derived from an acute dietary study which requires a 10X Database Uncertainty Factor.		

d. Endocrine Disruptor Effects

EPA is required under the FFDCA, as amended by FQPA, to develop a screening program to determine whether certain substances (including all pesticide active and other ingredients) “may have an effect in humans that is similar to an effect produced by a naturally occurring estrogen, or other endocrine effects as the Administrator may designate.” Following recommendations of its Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC), EPA determined that there was scientific basis for including, as part of the program, the androgen and thyroid hormone systems, in addition to the estrogen hormone system. EPA also adopted EDSTAC’s recommendation that EPA include evaluations of potential effects in wildlife. For pesticides, EPA will use FIFRA and, to the extent that effects in wildlife may help determine whether a substance may have an effect in humans, FFDCA authority to require the wildlife evaluations. As the science develops and resources allow, screening of additional hormone systems may be added to the Endocrine Disruptor Screening Program (EDSP).

When the appropriate screening and/or testing protocols being considered under the EDSP have been developed, MCPA may be subject to additional screening and/or testing to better characterize effects related to endocrine disruption.

e. Cumulative Risks

The Food Quality Protection Act (FQPA) requires that, when considering whether to establish, modify, or revoke a tolerance, the Agency consider “available information” concerning the cumulative effects of a particular pesticide’s residues and “other substances that have a common mechanism of toxicity.” Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to MCPA and any other substances, and MCPA does not appear to produce a toxic metabolite produced by other substances. For the purposes of this tolerance action, therefore, EPA has not assumed that MCPA has a common mechanism of toxicity with other substances. For information regarding EPA’s efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the policy statements released by EPA’s Office of Pesticide Programs concerning common mechanism determinations and procedures for cumulating effects from substances found to have a common mechanism on EPA’s website at <http://www.epa.gov/pesticides/cumulative/>.

f. Tolerance Summary

Tolerances have been established under 40 CFR §180.339(a) for residues of MCPA (2-methyl-4-chlorophenoxyacetic acid) *per se* in/on various plant commodities, and tolerances are established under 40 CFR §180.339(b) for the combined residues of MCPA and its metabolite 2-methyl-4-chlorophenol in livestock commodities.

Plant Commodities

OPP has determined that the residues to be regulated for risk assessment purposes in plant commodities are free and conjugated MCPA and its metabolite 2-HMCPA [(4-chloro-2-hydroxymethylphenoxy)acetic acid]. In the June 3, 2004, Residue Chemistry Chapter, EPA concluded that the metabolite CCPA [(4-chloro-2-carboxyphenoxy)acetic acid] should also be regulated for risk assessment purposes. However, based on additional information submitted by the registrant during risk mitigation discussions in August 2004, OPP concluded that CCPA is not a metabolite of concern. This conclusion is reflected in the Residue Chemistry Chapter for MCPA, dated September 14, 2004. The residues to be regulated for tolerance reassessment purposes are MCPA, *per se*.

The MCPA tolerance expression for plant commodities at 40 CFR §180.339(a) includes several forms of MCPA that either no longer correspond to registered manufacturing use or end use products or which are not supported for reregistration. As a result, the following salts and esters will be deleted from the tolerance expression: ethanolamine salt, diethanolamine salt, triethanolamine salt, isopropanolamine salt, diisopropanolamine salt, triisopropanolamine salt, isooctyl ester, and butoxyethyl ester. Furthermore, the 2-ethylhexyl ester (2-EHE) form will be added to the tolerance expression. The form 2-ethylhexyl ester more accurately identifies the isooctyl ester group associated with MCPA, and all but one of the products previously registered under the active ingredient name MCPA isooctyl ester are now registered as 2-EHE products.

It should be noted that the chemical name for MCPA has been presented both as “(2-methyl-4-chlorophenoxy)acetic acid” and “(4-chloro-2-methylphenoxy)acetic acid.” Although both names are correct, the “(4-chloro-2-methylphenoxy)acetic acid” designation is preferred under current conventions for naming chemicals.

Accordingly, the tolerance definition listed under 40 CFR § 180.339(a) should be amended to read as follows:

Tolerances are established for residues of the herbicide 4-chloro-2-methylphenoxyacetic acid from application of the herbicide in the acid form, in the form of its sodium or dimethylamine salts, or its 2-ethylhexyl ester in or on raw agricultural commodities as follows:

Livestock Commodities

The current tolerance expression for livestock commodities at 40 CFR § 180.339(b) includes MCPA and its metabolite 2-methyl-4-chlorophenol. Based on limited toxicity data on 2-methyl-4-chlorophenol, a currently regulated livestock metabolite, EPA expects this metabolite to be significantly less toxic than the parent compound. Therefore, 2-methyl-4-chlorophenol can be excluded from the tolerance expression, and only residues of MCPA, *per se*, will be regulated in livestock commodities. Accordingly, the tolerance definition listed under 40 CFR § 180.339(b) will be amended to read as follows:

Tolerances are established for the negligible residues (N) of the herbicide (4-chloro-2-methylphenoxy)acetic acid in or on the following raw agricultural commodities:

MCPA Tolerances

The MCPA Task Force Three has agreed to voluntarily cancel use of MCPA on rice and grain sorghum. Therefore, the Agency will commence proceedings to propose the revocation of the corresponding tolerances.

A summary of the MCPA tolerances is presented in Table 36. A full description of the tolerance reassessment can be found in the Residue Chemistry Chapter for MCPA (dated June 3, 2004, and September 14, 2004).

Table 36: Tolerance Summary for MCPA – 40 CFR §180.339(a), (b)

Commodity	Current Tolerance, ppm	Tolerance Reassessment, ppm
40 CFR §180.339(a) – Tolerances are established for residues of the herbicide 4-chloro-2-methylphenoxyacetic acid from application of the herbicide in the acid form, in the form of its sodium or dimethylamine salts, or its 2-ethylhexyl ester in or on raw agricultural commodities as follows:		
Alfalfa	0.1	0.1
Alfalfa, hay	0.1	0.1
Barley, grain	0.1 (N)	0.1 (N)
Barley, straw	2	2
Canarygrass, annual, seed	0.1	0.1
Clover	0.1	0.1
Clover, hay	0.1	0.1
Flax, straw	2	2
Flaxseed	0.1 (N)	0.1 (N)
Grass, canary, annual, straw	0.1	0.1
Grass, pasture	300	300
Grass, rangeland	300	300
Grass, hay	20	20
Lespedeza	0.1	0.1
Oat, forage	20	20
Oat, grain	0.1 (N)	0.1 (N)
Oat, straw	2	2
Peavines	0.1 (N)	0.1 (N)
Peavines, hay	0.1 (N)	0.1 (N)
Rice, grain	0.1 (N)	Revoke

Commodity	Current Tolerance, ppm	Tolerance Reassessment, ppm
Rice, straw	2	Revoke
Rye, grain	0.1 (N)	0.1 (N)
Rye, straw	2	2
Sorghum, fodder	20	20
Sorghum, forage	20	20
Sorghum, grain	0.1	Revoke
Trefoils	0.1	0.1
Trefoil hay	0.1	0.1
Vegetables, seed and pod	0.1	0.1
Vetches	0.1	0.1
Vetch, hay	0.1	0.1
Wheat, grain	0.1 (N)	0.1 (N)
Wheat, straw	2	2
40 CFR §180.339(b) – Tolerances are established for the negligible residues (N) of the herbicide (4-chloro-2-methylphenoxy)acetic acid in or on the following raw agricultural commodities:		
Cattle, fat	0.1 (N)	0.1 (N)
Cattle, meat byproducts	0.1 (N)	0.1 (N)
Cattle, meat	0.1 (N)	0.1 (N)
Goat, fat	0.1 (N)	0.1 (N)
Goat, meat byproducts	0.1 (N)	0.1 (N)
Goat, meat	0.1 (N)	0.1 (N)
Hog, fat	0.1 (N)	0.1 (N)
Hog, meat byproducts	0.1 (N)	0.1 (N)
Hog, meat	0.1 (N)	0.1 (N)
Horse, fat	0.1 (N)	0.1 (N)
Horse, meat byproducts	0.1 (N)	0.1 (N)
Horse, meat	0.1 (N)	0.1 (N)
Milk	0.1 (N)	0.1 (N)
Sheep, fat	0.1 (N)	0.1 (N)
Sheep, meat byproducts	0.1 (N)	0.1 (N)
Sheep, meat	0.1 (N)	0.1 (N)

* Bolded entries indicate revised tolerance.

(1) **Codex/International Harmonization**

No Codex MRLs have been established for MCPA; therefore, issues of compatibility between Codex MRLs and U.S. tolerances do not exist. No Canadian or Mexican MRLs have been established for MCPA. We note that registered food uses of MCPA exist in Canada (for crops such as wheat, barley, rye, oats, flax, peas, corn, pasture grass, alfalfa, and trefoil); these uses presumably fall under the PMRA General MRL of 0.1 mg/kg [Regulation B.15.002(1) of the Canadian Food and Drugs Regulations (FDR) establishes 0.1 ppm as the “General Maximum Residue Limit.” This regulation states that a food is adulterated if it contains residues of a pesticide at a level greater than 0.1 ppm unless a specific MRL has been established in Table II, Division 15 of the FDR.]

2. Labels

Provided the following risk mitigation measures are incorporated in their entirety into labels for MCPA-containing products, the Agency finds that all currently registered uses of MCPA are eligible for reregistration except rice and grain sorghum, which are uses that the registrants have agreed to voluntarily cancel. The regulatory rationale for each of the mitigation measures outlined below is discussed immediately after this list of mitigation measures.

3. Mitigation for Agricultural Uses

The Agency has identified the following mitigation measures that reduce risks to agricultural workers and wildlife to levels the Agency considers reasonable:

a. Use Cancellations

The MCPA Task Force Three has requested the voluntary cancellation of rice and grain sorghum. The Agency will publish a FIFRA 6(f) cancellation notice in the Federal Register and propose the revocation of the associated tolerances. As a condition of reregistration, end-use products labeled for these uses must be amended to remove these use sites.

b. Application Rate Reductions

The MCPA Task Force Three has agreed to the following reductions to the maximum label rates for MCPA. As a condition of re-registration, end-use products labeled for these uses will be amended to reflect the new application rates.

Table 37: MCPA Use Rate Reductions

Site	Old Maximum Rate	New Maximum Rate	Typical Rate	Comments
Wheat	1.5 lb/A	0.75 lb/A	0.375 lb/A	Pre-boot stage. Maximum rate may be divided into two applications.

Site	Old Maximum Rate	New Maximum Rate	Typical Rate	Comments
Barley	1.5 lb/A	0.75 lb/A	0.375 lb/A	Pre-boot stage. Maximum rate may be divided into two applications.
Oats	1.5 lb/A	0.75 lb/A	0.375 lb/A	Pre-boot stage. Maximum rate may be divided into two applications.
Rye	1.5 lb/A	0.75 lb/A	0.375 lb/A	Pre-boot stage. Maximum rate may be divided into two applications.
Flax	0.375 lb/A	0.25 lb/A	0.25 lb/A	IR-4 use
Residential Turf	2.0 lb/A	1.5 lb/A	1.0 lb/A	Up to 2 applications per year with a minimum retreatment interval of 21 days.
Sod Farms	2.0 lb/A	1.5 lb/A	1.0 lb/A	Up to 2 applications per year with a minimum retreatment interval of 21 days.
Golf Courses	2.0 lb/A	1.5 lb/A	1.0 lb/A	Up to 2 applications per year with a minimum retreatment interval of 21 days.
Grass Grown for Seed	2.0 lb/A	1.5 lb/A	1.0 lb/A	Up to 2 applications per year with a minimum retreatment interval of 21 days.
Pasture/ rangeland	4.0 lb/A	1.5 lb/A	1.25 lb/A	Up to 2 applications per year with a minimum retreatment interval of 21 days.
Noncropland, Rights-of-Way (Broadcast treatment)	4.0 lb/A	1.5 lb/A	1.5 lb/A	Broadcast treatment – Up to 2 applications per year with a minimum retreatment interval of 21 days.
Noncropland, Rights-of-Way (Spot treatment)	4.0 lb/A	3.0 lb/A	2.25 lb/A	Localized hard-to-kill herbaceous plants, brush, or woody plants.

D. Regulatory Rationale

Following the release of the MCPA risk assessments, a series of meetings were held with the MCPA Task Force Three to discuss ways to reduce residential, occupational, and ecological risks to levels below the Agency's level of concern. In conjunction with those meetings, the task force submitted additional data and information bearing directly on the risks of concern. In particular, the task force submitted new information about typical application rates and how the product is used. Furthermore, the task force submitted a new dermal absorption study. The Agency reviewed the new dermal absorption study, and concluded that the dermal absorption factor for converting dermal exposures to oral equivalent doses should be decreased from thirty percent to seven percent.

In July 2004, after the revised MCPA risk assessments were released for 60-day public comment, the Agency conducted a new dose analysis for determining the need for and size of Database Uncertainty

Factors to account for the lack of a developmental neurotoxicity (DNT) study. This most recent analysis was based on new scientific information gained from the Agency's review of several recently-submitted DNT studies. The change affected the MCPA residential, dietary, and drinking water health risk assessments. Originally, a 10X Database Uncertainty Factor for the lack of a DNT study was applied for all routes and durations of residential and dietary exposure. Based on the new analysis, the 10X was retained for acute dietary, acute incidental oral, and acute residential dermal exposure scenarios. However, the Database Uncertainty Factor was decreased to 3X for short- and intermediate-term dermal exposures, and was removed (1X) for all other exposure durations and routes. Please see Section IV.C.1.c, above, for additional discussion of the Database Uncertainty Factor.

The new application of Database Uncertainty Factors necessitated revisions to the occupational/residential, dietary, and drinking water health risk assessments. Therefore, the following revised documents are being released along with this RED document:

- MCPA Revised Human Health Risk Assessment for the Reregistration Eligibility Decision (RED) Document, dated September 14, 2004;
- Second Revised Occupational and Residential Exposure and Risk Assessment for the Reregistration Eligibility Decision (RED) Document, dated September 7, 2004;
- MCPA Revised Product & Residue Chemistry Chapter for the Reregistration Eligibility Decision, dated September 14, 2004; and
- Revised MCPA Acute and Chronic Dietary Exposure Assessment for the Reregistration Eligibility Decision, dated September 15, 2004.

The following is a summary of the rationale for managing risks associated with the use of MCPA. Where labeling revisions are warranted, specific language is set forth in the summary tables of Section V of this document.

1. Human Health Risk Management

a. Dietary (Food) Risk Mitigation

Acute and chronic dietary risk from food alone is below the Agency's level of concern. No mitigation is required.

b. Drinking Water Risk Mitigation

Risk from drinking water is below the Agency's level of concern. No mitigation is required.

c. Residential Risk Mitigation

(1) Residential Handler Mitigation

Residential handler risk from application of MCPA products at the new lower application rates (as presented in Section IV.C.3), calculated using the revised dermal absorption value (as discussed in Section IV.D) and the new Database Uncertainty Factors (as discussed in Section IV.D), resulted in risk estimates that are below the Agency's level of concern (i.e., the dermal MOEs exceed 300 and the inhalation MOEs exceed 100). In addition, the Aggregate Risk Index (ARI) for the combined dermal and inhalation exposures exceeds 1.0, and therefore the combined risks are also not of concern. No additional mitigation is required. See Table 37, below, for a summary of the revised MOEs and ARIs.

Table 38: Revised MCPA Short-term MOEs for Homeowner Applications to Lawns

Scenario (Application Rate = 1.5 lb ai/acre)	Treated Area (acres/day)	Dermal MOE (Target MOE = 300)	Inhalation MOE (Target MOE = 100)	ARI^A
Hand Application of Granules	0.023	1800	19000	5.8
Belly Grinder Application	0.023	1800	140000	6.1
Load/Apply Granules with a Broadcast Spreader	0.5	14000	4500000	46
Mix/Load/Apply with a Hose-end Sprayer (Mix your own)	0.5	850	26000	2.8
Mix/Load/Apply with a Hose-end Sprayer (Ready to Use)	0.5	3600	37000	12
Mix/Load/Apply with Hand Held Pump Sprayer	0.023	5300	1900000	18
Mix/Load/Apply with Ready to Use Sprayer	0.023	3800	250000	12
^A ARI = 1/((300/Dermal MOE) + (100/Inhalation MOE))				

(2) Residential Postapplication Mitigation

Using the lower application rates (as presented in Section IV.C.3) and the new dermal absorption value (as discussed in Section IV.D), and applying the new Database Uncertainty Factors (as discussed in Section IV.D), the individual MOEs for acute exposures to both adults and toddlers are below the Agency's level of concern (i.e., MOEs are above 1,000). However, when these individual MOEs are combined across exposure pathways, the MOE for combined toddler acute exposures (from dermal, hand-to-mouth, object-to-mouth, and soil ingestion exposure) is slightly less than 1,000 (MOE=940), and therefore exceeds the EPA's level of concern. See Table 38, below, for a summary of the revised acute MOEs for postapplication turf exposures.

Because the MOE for combined toddler acute exposures may be of concern to the Agency, the MCPA Task Force has committed to undertake a study to determine the dermal transfer efficiency of MCPA residues from turf to dry and wetted palms. This hand-press study is intended to confirm that the transfer coefficient used in the toddler exposure assessment is conservative and overestimates risk from mouthing

behaviors. The Agency believes that the chemical-specific data in this study will verify that the residue dislodgeable from wet hands is, to some degree, less than the 5% default used in the assessment. This study must be submitted within the 9-month time period allotted to submit revised labels for MCPA.

Table 39: Revised Acute MOEs for Turf Exposures*

Population Subgroup	Scenario	TTR (ug/cm ²)	TC (cm ² /hr)	Dermal MOE (Target MOE = 1,000)	Hand-to Mouth MOE (Target MOE = 1,000)	Object to Mouth MOE (Target MOE = 1,000)	Soil Ingestion MOE (Target MOE = 1,000)	Total MOE (Target MOE = 1,000)
Toddlers	Playing	0.514	5200	2000	2200	8900	670000	940
Females (age 13 to 50)	Yardwork	0.514	14500	2300	N/A	N/A	N/A	2300
	Golfing		500	33300				33300
All Other Adults	Yardwork	0.514	14500	3400	N/A	N/A	N/A	3400
	Golfing		500	49000				49000
Note: Bolded MOEs indicate that the scenario exceeds the Agency's Level of Concern * Assuming an application rate of 1.5 lb ae/acre.								

The revised MOEs for short-term exposures to adults and toddlers exceed the target MOEs, and the Aggregate Risk Index (ARI) for toddlers exceeds 1.0. Therefore, the risks for adults and toddler short-term exposures are not of concern either when considered separately or when combined. No additional mitigation is required. See Table 39, below, for a summary of the revised MOEs and ARIs.

Table 40: Revised Short Term MOEs and ARI Values for Turf Exposures*

Scenario	TTR (ug/cm ²)	TC (cm ² /hr)	Dermal MOE (Target MOE = 300)	Hand-to Mouth MOE (Target MOE = 100)	Object to Mouth MOE (Target MOE = 100)	Soil Ingestion MOE (Target MOE = 100)	ARI ^A
Playing	0.097	5200	1500	510	2000	150000	2.23
	0.081		1800	720	2900	210000	2.91
Yardwork	0.097	14500	2500	N/A			
	0.081		2900				
Golfing	0.097	500	36000				
	0.081		43000				

^A ARI = 1/((300/Dermal MOE) + (100/Hand-to-Mouth MOE)+(100/Object-to-Mouth MOE)+(100/Soil Ingestion MOE))

* Assuming an application rate of 1.5 ae/acre, exposure body weight 15 kg for toddlers.

d. Aggregate Risk Mitigation

(1) Short-term Aggregate Risk

Table 40, below, presents the results of a short-term aggregate exposure assessment that quantifies risk from short-term exposure to food, water, and residential sources. The assessment was conducted with the revised short-term ARI values, which reflect the lower application rates agreed to by the registrants, the new dermal absorption value, and the new Database Uncertainty Factors.

Comparison of the short-term DWLOCs with the environmental concentrations of MCPA estimated using PRZM-EXAMS and SCI-GROW modeling indicate that short-term aggregate risks are not of concern. The DWLOCs are less than the surface water EEC of 1.9 ppb and the ground water EEC of 2.13 ug/l, and therefore, the short-term aggregate risks are not of concern. No mitigation is required.

Table 41: MCPA Short-term Aggregate Risks (Expressed as DWLOCs)

Population Subgroup	Body Weight (kg)	Daily Water Consumption (liter/day)	Food Exposure (mg/kg/day)	Food ARI ¹	Turf ARI ^{2,3}	Available ARI for Water Exposure ⁴	Available Water Exposure ⁵ (mg/kg/day)	DWLOC ⁶ (ug/l)
U.S. Population	70	2	0.0013	34	8.3	1.2	0.037	1300
Children 1-2 yr	10	1	0.0038	12	2.2	2.2	0.020	200

Notes 1. Food ARI = cPAD/Food Exposure where the cPAD = 0.044 mg/kg/day

2. Turf ARI for children taken from Table 39, above. $ARI = 1/((300/\text{Dermal MOE}) + (100/\text{Hand-to-Mouth MOE}) + (100/\text{Object-to-Mouth MOE}) + (100/\text{Soil Ingestion MOE}))$

3. Turf ARI for adults = Dermal MOE/Target MOE, where dermal MOE = 2500 and Target MOE = 300.

4. Available ARI: $1 = 1/((1/\text{Food ARI}) + (1/\text{Turf ARI}) + (1/X))$ where X = Available ARI

5. Available Water Exposure = cPAD/Available ARI for Water Exposure

6. DWLOC = (Available Water Exposure X Body Weight)/(Daily Water Consumption X 0.001mg/ug)

(2) Chronic Aggregate Risk

No chronic residential scenarios have been identified for MCPA. Therefore, chronic aggregate risks are based solely on dietary exposure from food and water. Conservative exposure estimates for food and drinking water indicate that there is no concern for chronic health risks from these pathways. No mitigation is required.

e. Occupational Risk Mitigation

(1) Handler Risk Mitigation

When assessed at the lower application rates (as presented in Section IV.C.3) and the new dermal absorption value (as discussed in Section IV.D), all of the occupational handler MOEs exceed target MOEs with baseline Personal Protective Equipment (long pants, long sleeved shirt, shoes with socks, and no gloves or respirator) for all scenarios except for the mixing and loading of liquids for aerial, groundboom, and right-of-way sprayer application, and the mixing and loading of wettable powder to groundboom application to golf courses. With the addition of chemical resistant gloves, all scenarios except for mixing/loading liquids for application to rangeland/pastureland do not exceed the Agency's level of concern (MOEs > 100). The MOE for mixing/loading liquids for rangeland/pastureland application does not exceed the Agency's level of concern when assessed with single layer PPE and a filtering facepiece respirator (i.e., dustmask) with a protection factor of five. See Table 41 for a summary of the revised MOEs.

Table 42 - Revised Short/Intermediate Term MOEs for Occupational Handlers

Exposure Scenario	Formulation/ Application Method	Crop or Site	Application Rate (lb ae/acre)	Acres/ Day	Baselin e	Single Layer with gloves	Single Layer PF5 with gloves
Mixer/Loader (M/L)	M/L Wettable Powder for Groundboom	Golf Courses	1.5	40	25	110	320
	M/L Liquids for Aerial	Rangeland, Pastures	1.5	1200	1.3	77	140
		Small Grains	0.75	1200	2.7	150	280
		Flax and Peas	0.375	1200	5.3	310	550
	M/L Liquids for Groundboom	Rangeland, Pastures	1.5	200	8	460	820
		All other Crops	0.375 to 0.75	200	≥16	≥920	≥1600
		Golf Courses	1.5	40	30	1700	3100
	M/L Liquids for Row Sprayer	Weed Control	1.5	50	32	1900	3300
		Brush Control	3.0	10	80	4600	8200
	Load Granulars for Broadcast Spreader	Golf Courses	1.5	40	2500	2600	8000
Applicator	Aerial Application	All Crops Above	0.375 to 1.5	1200	≥ 590	ND	ND
	Groundboom Application	All Crops Above	0.375 to 1.5	40 to 200	≥760	≥760	≥1300
	Right of Way Application	Weed Control	1.5	50	67	190	230
		Brush Control	3.0	10	170	490	570
	Broadcast Spreader Application	Golf Courses	1.5	40	3100	3400	9200
Mixer/Loader/ Applicator (M/L/A)	M/L/A Liquids with Backpack Sprayer	Spot Treatment	3	4	ND	220	230
	M/L/A Wettable Powder with Turfgun	turf	1.5	5	ND	430	910
	M/L/A Liquid Flowables with Turfgun	turf	1.5	5	ND	1700	1800
	Load/Apply Granules with a Push Cyclone	turf	1.5	5	ND	290	350
Flagger	Flag Aerial Application	Rangeland, Pasture	1.5	1200	210	190	290
		All other Crops	0.375 to 0.75	1200	≥410	≥390	≥570
Note - MOEs in bold font are below the target MOE of 100 and indicate risks of concern.							

In addition to the required application rate reductions and use cancellations presented in Section IV.C.3, the following mitigation is required to address risks to occupational handlers.

- Single-layer PPE (long pants, long sleeved shirt, shoes, socks, and chemical resistant gloves) and a PF5 Respirator must be worn when handlers are performing the following tasks:

Mixing/Loading Liquids for aerial application to rangeland/pastures

- **Single-layer PPE (long pants, long sleeved shirt, shoes, socks, and chemical resistant gloves)** must be worn when handlers are performing the following tasks:

Mixing/Loading wettable powders for groundboom application

Mixing/Loading liquids for aerial application to small grains, flax, and peas

Mixing/Loading liquids for groundboom application

Mixing/Loading liquids using row sprayer

Mixing/Loading/Applying liquids with backpack sprayer

Mixing/Loading/Applying wettable powders with turfgun

Mixing/Loading/Applying liquids flowables with turfgun

Loading/Applying granules with a push cyclone

Applying to rights-of-way for weed control

- **Baseline PPE (long pants, long sleeved shirt, shoes, and socks)** must be worn by handlers during the following activities:

Applying aerially, or by groundboom or broadcast spreader

Flagging aerial spray applications

(2) Post-application Risk Mitigation

When assessed at the lower application rates (as presented previously in Section IV.C.3), all of the short/intermediate term MOEs for post-application occupational exposure to MCPA exceed the target MOE, which indicates that the risks are not of concern. Chronic post-application occupational exposure was not evaluated because MCPA is typically applied once per season, and thus chronic exposure is not expected. See Table 42 for a summary of the MOEs.

Table 43: MCPA Postapplication Worker Risks

Crop	Transfer Coefficient Group	Short/Intermediate Term MOE on Day 0			
		Application Rate (lb ae/acre)	Low Exposure Scenarios	Medium Exposure Scenarios	High Exposure Scenarios
Flax	Field/row crop, low/medium	0.375	10000	690	NA
Peas	Field/row crop, low/medium	0.375	10000	NA	NA
Small Grains	Field/row crop, low/medium	0.75	5200	340	NA
Turf	Turf - California	1.5	960	NA	480

Table 43: MCPA Postapplication Worker Risks

Crop	Transfer Coefficient Group	Short/Intermediate Term MOE on Day 0			
		Application Rate (lb ae/acre)	Low Exposure Scenarios	Medium Exposure Scenarios	High Exposure Scenarios
	Turf - North Carolina	1.5	500	NA	250

The Restricted Entry Interval (REI) represents the amount of time required for residues to dissipate in treated areas prior to beginning a job or task in that area such that the resulting exposures do not exceed the Agency's level of risk concern. In order to determine the REI for a crop, EPA calculates the number of days that must elapse after pesticide application until residues dissipate and risk to a worker falls below the target risk level. For a specific crop/pesticide combination, the duration required to achieve the target risk estimate can vary depending on the activity assessed. The current REIs are 12 hours for the ester form and 48 hours for the amine and sodium salt forms. The current REIs are sufficiently protective, and thus no modification is required. There is no REI for the acid form because the acid form is used only on non-agricultural sites (such as lawns and golf courses).

2. Environmental Risk Mitigation

Implementation of the mitigation measures described above – the rate reductions and use cancellations presented in Section IV.C.3 – has resulted in decreases in exposure values, leading to significantly lower RQ's for terrestrial and aquatic organisms, as well as terrestrial and aquatic plants. There are a few scenarios which still show LOC exceedances at the lower application rates, particularly terrestrial plants. However, most of these exceedances are slight and, therefore, EPA has determined that no further risk mitigation is necessary for environmental concerns.

An additional mitigation measure that was agreed to by registrants and which will be required on applicable end-use products is a statement limiting spray droplet size to “medium to coarse,” thereby prohibiting “fine” sprays. This mitigation measure should provide additional protection to wildlife and plants.

3. Other Labeling Requirements

In order to be eligible for reregistration, various use and safety information must also be placed on the labeling of all end-use products containing MCPA. For the specific labeling statements, refer to Section V of this document.

a. Endangered Species Statement

The Agency has developed the Endangered Species Protection Program to identify pesticides whose use may cause adverse impacts on endangered and threatened species, and to implement mitigation

measures that address these impacts. The Endangered Species Act requires federal agencies to ensure that their actions are not likely to jeopardize listed species or adversely modify designated critical habitat. To analyze the potential of registered pesticide uses that may affect any particular species, EPA uses basic toxicity and exposure data and considers ecological parameters, pesticide use information, geographic relationship between specific pesticide uses and species locations, and biological requirements and behavioral aspects of the particular species.

Based on EPA's screening level assessment for MCPA, RQs exceed levels of concern for mammals, birds, aquatic plants, and terrestrial plants. However, these findings are based solely on EPA's screening level assessment and do not constitute "may affect" findings under the ESA. The Agency is requiring application rate reductions and additional mitigation to minimize these LOC exceedances, and is requiring additional data to further characterize and refine its ecological and endangered species risk assessments.

b. Spray Drift Management

The Agency is in the process of developing more appropriate label statements for spray and dust drift control to ensure that public health, and the environment is protected from unreasonable adverse effects. The Agency will publish final guidance in a Pesticide Registration notice for registrants to use when labeling their products.

V. What Registrants Need to Do

The Agency has determined that MCPA is eligible for reregistration provided that: (i) additional data that the Agency intends to require confirm this interim decision; and (ii) the risk mitigation measures outlined in this document are adopted, and label amendments are made to reflect these measures. To implement the risk mitigation measures, the registrants must amend their product labeling to incorporate the label statements set forth in the Label Summary Table in Section V.D (Table 43). The additional data requirements that the Agency intends to obtain will include, among other things, submission of the following:

A. For MCPA technical grade active ingredient products, registrants need to submit the following items.

Within 90 days from receipt of the generic data call-in (DCI):

- (1) completed response forms to the generic DCI (i.e., DCI response form and requirements status and registrant's response form); and
- (2) submit any time extension and/or waiver requests with a full written justification.

Within the time limit specified in the generic DCI:

- (1) cite any existing generic data which address data requirements or submit new generic data responding to the DCI.

Please contact Kelly White at (703) 305-8401 with questions regarding generic reregistration and/or the DCI. All materials submitted in response to the generic DCI should be addressed as follows:

By US mail:

Document Processing Desk (DCI/SRRD)
Kelly White
US EPA (7508C)
1200 Pennsylvania Ave., NW
Washington, DC 20460

By express or courier service:

Document Processing Desk (DCI/SRRD)
Kelly White
Office of Pesticide Programs (7508C)
Room 266A, Crystal Mall 2
1801 Bell Street
Arlington, VA 22202

B. For products containing the active ingredient MCPA, registrants need to submit the following items for each product.

Within 90 days from the receipt of the product-specific data call-in (PDCI):

- (1) completed response forms to the PDCI (i.e., PDCI response form and requirements status and registrant's response form); and
- (2) submit any time extension or waiver requests with a full written justification.

Within eight months from the receipt of the PDCI:

- (1) two copies of the confidential statement of formula (EPA Form 8570-4);
- (2) a completed original application for reregistration (EPA Form 8570-1). Indicate on the form that it is an "application for reregistration";
- (3) five copies of the draft label incorporating all label amendments outlined in Table 43 of this document;
- (4) a completed for certifying compliance with data compensation requirements (EPA Form 8570-34);
- (5) if applicable, a completed for certifying compliance with cost share offer requirements (EPA Form 8570-32); and
- (6) the product-specific data responding to the PDCI.

Please contact Bonnie Adler at (703) 308-8523 with questions regarding product reregistration and/or the PDCI. All materials submitted in response to the PDCI should be addressed as follows:

By US mail:

Document Processing Desk (PDCI/PRB)
Bonnie Adler
US EPA (7508C)
1200 Pennsylvania Ave., NW
Washington, DC 20460

By express or courier service:

Document Processing Desk (PDCI/PRB)
Bonnie Adler
Office of Pesticide Programs (7508C)
Room 266A, Crystal Mall 2
1921 Jefferson Davis Highway
Arlington, VA 22202

A. Manufacturing Use Products

1. Additional Data Requirements

The generic database supporting the reregistration of MCPA has been reviewed and determined to be substantially complete. However the following data requirements are necessary to confirm the reregistration eligibility decision in this RED.

Toxicology:

- 870.6300 Developmental neurotoxicity study in rats with MPCA EHE
- 870.3465 Twenty eight (28) day inhalation study in rats (abbreviated 90-day protocol). The Agency is requiring this study due to the concern for the potential occupational exposure via this route based on the current use pattern. The registrant is recommended to follow all the procedures stipulated in the Subdivision F Guidelines for the 90-day inhalation study (870.3465) except that the exposure duration can be reduced to 28 days

Environmental Fate:

- 835.1410 Laboratory volatility study with MCPA EHE
- 835.4100 Laboratory fate data for aerobic soil metabolism for MCPA EHE, preferably under acid conditions
- 835.1240 Laboratory fate data for a batch equilibrium study conducted with MCPA EHE, preferably under a range of pHs

Ecological Effects:

- 850.4225 Seedling Emergence (Tier II) for three formulations of MCPA: (1) either the acid or sodium salt, (2) DMAS, and (3) EHE, all using a TEP
- 850.4250 Vegetative Vigor (Tier II) for three formulations of MCPA: (1) either the acid or sodium salt, (2) DMAS, and (3) EHE, all using a TEP
- 850.4400 Aquatic Plant Growth (Tier II with Lemna sp.) using three formulations of MCPA: (1) either the acid or sodium salt, (2) DMAS, and (3) EHE, all using a TEP

- 850.2200 Avian Dietary LC₅₀ Guideline for one species (preferably bobwhite quail) using MCPA EHE.

Residue Chemistry:

- 860.1300 Metabolism studies on peas
- 860.1340 Residue analytical method: The Residue Chemistry Chapter of the Registration Standard dated 8/31/81 noted that the PAM Vol I method is adequate for enforcement of tolerances for residues of MCPA in livestock commodities as-is, however the Agency is now requiring the method be modified with a hydrolysis step for enforcement of MCPA tolerances for plant commodities.
- 860.1380 Storage stability data for wheat grain stored under ambient conditions for 28 days
- 860.1480 Ruminant feed study
- 860.1500 Four field trials reflecting a 0-day PHI for pasture forage
- 860.1900 A study detailing confined accumulation in rotational crops planted following treatment at 1.5 lb ae/A

Occupational/Residential Exposure:

- 875.1100 Hand press study

2. Labeling for Manufacturing Use Products

To ensure compliance with FIFRA, manufacturing use product (MUP) labeling should be revised to comply with all current EPA regulations, PR Notices and applicable policies. The MP labeling should bear the labeling contained in Table 43 at the end of this section.

B. End-Use Products

1. Additional Product-Specific Data Requirements

Section 4(g)(2)(B) of FIFRA calls for the Agency to obtain any needed product-specific data regarding the pesticide after a determination of eligibility has been made. Registrants must review previous data submissions to ensure that they meet current EPA acceptance criteria, and if not, commit to conduct new

studies. If a registrant believes that previously submitted data meet current testing standards, then the study MRID numbers should be cited according to the instructions in the Requirement Status and Registrants Response Form provided for each product.

A product-specific data call-in, outlining specific data requirements, accompanies this RED.

2. Labeling for End-Use Products

Labeling changes are necessary to implement the mitigation measures outlined in Section IV above. Specific language to incorporate these changes is specified in Table 44.

C. Labeling Changes Summary Table

In order to be eligible for reregistration, amend all product labels to incorporate the risk mitigation measures outlined in Section IV. The following table describes how language on the labels should be amended.

Table 44: Labeling Changes Summary Table

In order to be eligible for reregistration, amend all product labels to incorporate the risk mitigation measures outlined in Section IV. The following table describes how language on the labels should be amended.

Table 44: Summary of Labeling Changes for MCPA		
Description	Amended Labeling Language	Placement on Label
For all Manufacturing Use Products	<p>"Only for formulation into an herbicide for the following use(s) [fill blank only with those uses that are being supported by MP registrant]."</p> <p>"Uses for rice and grain sorghum are canceled. Technical and end-use product labels must be revised to delete all references to and use-directions for these canceled use patterns."</p>	Directions for Use
One of these statements may be added to a label to allow reformulation of the product for a specific use or all additional uses supported by a formulator or user group	<p>"This product may be used to formulate products for specific use(s) not listed on the MP label if the formulator, user group, or grower has complied with U.S. EPA submission requirements regarding support of such use(s)."</p> <p>"This product may be used to formulate products for any additional use(s) not listed on the MP label if the formulator, user group, or grower has complied with U.S. EPA submission requirements regarding support of such use(s)."</p>	Directions for Use
Environmental Hazards Statements Required by the RED and Agency Label Policies	"Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollution Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA."	Precautionary Statements

End Use Products Intended for Occupational Use		
PPE Requirements Established by the RED ¹ for Liquid Concentrate Formulations	<p>“Some materials that are chemical-resistant to this product are” (<i>registrant inserts correct chemical-resistant material</i>). “If you want more options, follow the instructions for category” [<i>registrant inserts A,B,C,D,E,F,G,or H</i>] “on an EPA chemical-resistance category selection chart.”</p> <p>“Personal Protective Equipment (PPE)”</p> <p>“Mixers, loaders, applicators, flaggers and other handlers must wear:</p> <ul style="list-style-type: none"> - Long- sleeved shirt and long pants, - Shoes plus socks, and - Chemical- resistant gloves when mixing, loading, or using any hand-held equipment.” 	Immediately following/below Precautionary Statements: Hazards to Humans and Domestic Animals
Additional PPE Requirements Established by the RED for Liquid Concentrate Formulations that contain directions for use for aerial application to rangeland, or pasture land, or noncropland	<p>“Additional PPE requirements for mixers and loaders supporting aerial application to rangelands, pasture lands, or noncropland. These mixers/loaders also must wear:</p> <ul style="list-style-type: none"> - a chemical-resistant apron, and - a NIOSH-approved respirator with a dust/ mist filter with MSHA/ NIOSH approval number prefix TC-21C <i>or</i> any N², R, P, or HE filter.” <p>“See engineering controls for additional requirements.”</p>	Immediately following the handler PPE statement specified for liquid concentrate formulations
PPE Requirements Established by the RED ¹ for Water Dispersable Granules and for Wettable Powder Formulations (including Wettable Powders formulated in water soluble packages.)	<p>“Some materials that are chemical-resistant to this product are” (<i>registrant inserts correct chemical-resistant material</i>). “If you want more options, follow the instructions for category” [<i>registrant inserts A,B,C,D,E,F,G,or H</i>] “on an EPA chemical-resistance category selection chart.”</p> <p>“Personal Protective Equipment (PPE)</p> <p>Mixers, loaders, applicators, and other handlers must wear:</p> <ul style="list-style-type: none"> - Long- sleeved shirt and long pants, - Shoes plus socks, and - Chemical-resistant gloves when mixing, loading, or using hand-held equipment.” 	Immediately following/below Precautionary Statements: Hazards to Humans and Domestic Animals

PPE Requirements Established by the RED ¹ for Granular Formulations	<p>“Personal Protective Equipment (PPE) Loaders, applicators, and other handlers must wear:</p> <ul style="list-style-type: none"> - Long- sleeved shirt and long pants, and - Shoes plus socks.” 	Immediately following/below Precautionary Statements: Hazards to Humans and Domestic Animals
User Safety Requirements	<p>“Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.”</p>	Precautionary Statements: Hazards to Humans and Domestic Animals immediately following the PPE requirements
Engineering Controls for aerial applications	<p>Enclosed Cockpits</p> <p>“Engineering Controls:</p> <p>Pilots must use an enclosed cockpit that meets the requirements listed in the WPS for agricultural pesticides [40 CFR 170.240(d)(6)].”</p>	Precautionary Statements: Hazards to Humans and Domestic Animals immediately following PPE and User Safety Requirements.

User Safety Recommendations	<p>“User Safety Recommendations</p> <p>Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.</p> <p>Users should remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.</p> <p>Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.”</p>	<p>Precautionary Statements under: Hazards to Humans and Domestic Animals immediately following Engineering Controls or if no Engineering Controls statements, immediately following User Safety Requirements</p> <p>(Must be placed in a box.)</p>
Environmental Hazards	<p>“This pesticide may be toxic to fish, aquatic invertebrates and aquatic plants. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours.”</p> <p>“This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.”</p>	<p>Precautionary Statements immediately following the User Safety Recommendations</p>
Restricted-Entry Interval for MCPA products that contain acid, amine, or sodium salt forms and have directions for use within the scope of the WPS	<p>“Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.”</p>	<p>Directions for Use, Under Agricultural Use Requirements Box</p>

Restricted-Entry Interval for MCPA products that contain only ester forms and have directions for use within the scope of the WPS	“Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.”	Directions for Use, Under Agricultural Use Requirements Box
Early Entry Personal Protective Equipment for MCPA products that contain acid, amine, or sodium salt forms and have directions for use within the scope of the WPS	<p>“PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:</p> <ul style="list-style-type: none"> * coveralls, * shoes plus socks, * chemical-resistant gloves made of any waterproof material, and * protective eyewear.” 	Direction for Use Agricultural Use Requirements box immediately following the REI statement
Early Entry Personal Protective Equipment for MCPA products that contain only ester forms and have directions for use within the scope of the WPS	<p>“PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:</p> <ul style="list-style-type: none"> * coveralls, * shoes plus socks, and * chemical-resistant gloves made of any waterproof material.” 	Direction for Use Agricultural Use Requirements box immediately following the REI statement
General Application Restrictions for products primarily intended for occupational (professional) use	“Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.”	Place in the Directions for Use directly above the Agricultural Use Box if there is one, otherwise place in Directions for Use under General Precautions and Restrictions

<p>Use-Specific Application Restrictions</p> <p>(Note: The maximum allowable application rate must be listed as pounds or gallons of formulated product per acre not just as pounds active equivalent per acre.)</p>	<p>Wheat Permitted forms of MCPA include acid, salts, amines, and esters "Do not apply more than 0.75 lb ae / acre per year (registrant state this in amount of formulation per acre per year)."</p> <p>Barley Permitted forms of MCPA include acid, salts, amines, and esters "Do not apply more than 0.75 lb ae / acre per year (registrant state this in amount of formulation per acre per year)."</p> <p>Oats Permitted forms of MCPA include acid, salts, amines, and esters "Do not apply more than 0.75 lb ae / acre per year (registrant state this in amount of formulation per acre per year)."</p> <p>Rye Permitted forms of MCPA include acid, salts, amines, and esters "Do not apply more than 0.75 lb ae / acre per year (registrant state this in amount of formulation per acre per year)."</p> <p>Flax Permitted forms of MCPA include acid, salts, amines, and esters "Do not apply more than 0.25 lb ae / acre per year (registrant state this in amount of formulation per acre per year)."</p>	<p>Directions for Use Associated with the Specific Use Pattern</p>
--	--	--

<p>Other Application Restrictions</p> <p>(Note: The maximum allowable application rate and maximum allowable rate per year must be listed as pounds or gallons of formulated product per acre, not just as pounds active equivalent per acre.)</p>	<p>Sod farms</p> <p>Permitted forms of MCPA include acid, salts, amines, and esters</p> <p>"Do not apply more than 1.5 lb ae / acre per year (registrant state this in amount of formulation per acre per year).</p> <p>Do not apply more than 2 applications per year with a minimum retreatment interval of 21 days."</p> <p>Golf Courses</p> <p>Permitted forms of MCPA include acid, salts, amines, and esters</p> <p>"Do not apply more than 1.5 lb ae / acre per year (registrant state this in amount of formulation per acre per year). Do not apply more than 2 applications per year with a minimum retreatment interval of 21 days."</p> <p>Grass Grown for Seed</p> <p>Permitted forms of MCPA include acid, salts, amines, and esters</p> <p>"Do not apply more than 1.5 lb ae / acre per year (registrant state this in amount of formulation per acre per year). Do not apply more than 2 applications per year with a minimum retreatment interval of 21 days."</p>	<p>Directions for Use Associated with the Specific Use Pattern</p>
--	--	--

<p>Other Application Restrictions</p> <p>(Note: The maximum allowable application rate and maximum allowable rate per year must be listed as pounds or gallons of formulated product per acre, not just as pounds active equivalent per acre.)</p>	<p>Pasture/ Rangeland</p> <p>Permitted forms of MCPA include acid, salts, amines, and esters</p> <p>“Do not apply more than 1.5 lb ae / acre per year (registrant state this in amount of formulation per acre per year).</p> <p>Do not apply more than 2 applications per year with a minimum retreatment interval of 21 days.”</p> <p>Noncropland Rights-of-Way (Broadcast Treatment)</p> <p>Permitted forms of MCPA include acid, salts, amines, and esters</p> <p>“Do not apply more than 1.5 lb ae / acre per year (registrant state this in amount of formulation per acre per year).</p> <p>Do not apply more than 2 applications per year with a minimum retreatment interval of 21 days.”</p> <p>Noncropland Rights-of-Way (Spot Treatment)</p> <p>Permitted forms of MCPA include acid, salts, amines, and esters</p> <p>“Do not apply more than 3.0 lb ae / acre per year (registrant state this in amount of formulation per acre per year).</p>	<p>Directions for Use Associated with the Specific Use Pattern</p>
<p>Use Deletions</p>	<p>- Rice</p> <p>Delete all references to applications to rice from all MCPA end-use labels.</p> <p>- Grain sorghum</p> <p>Delete all references to applications to grain sorghum from all MCPA end-use labels.</p>	

Spray Drift	<p>“SPRAY DRIFT MANAGEMENT”</p> <p>“Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.”</p> <p>“Apply only as a medium or coarser spray (ASAE standard 572) or a volume mean diameter of 300 microns or greater for spinning atomizer nozzles.”</p> <p>“Apply only when the wind speed is 2-10 mph at the application site.”</p> <p><i>Additional requirements for aerial applications:</i></p> <p>“The boom length must not exceed 75% of the wingspan or 90% of the rotor blade diameter.”</p> <p>“Release spray at the lowest height consistent with efficacy and flight safety. Do not release spray at a height greater than 10 feet above the crop canopy.”</p> <p>“When applications are made with a crosswind, the swath will be displaced downwind. The applicator must compensate for this displacement at the downwind edge of the application area by adjusting the path of the aircraft upwind.”</p> <p>“Do not make applications into temperature inversions.”</p> <p><i>Additional requirements for ground boom application:</i></p> <p>“Do not apply with a nozzle height greater than 4 feet above the crop canopy.”</p>	Directions for Use
-------------	--	--------------------

End Use Products Intended for Residential Use		
Application Restrictions	“Do not apply this product in a way that will contact any person, or pet, either directly or through drift. Keep people and pets out of the area during application.”	Directions for Use under General Precautions and Restrictions
Other Application Restrictions (Note: The maximum allowable application rate must be listed as pounds or gallons of formulated product per acre not just as pounds active ingredient per acre.)	Residential Turf “Do not apply more than 1.5 lb ae / acre per year (registrant state this in amount of formulation per acre per year). Do not apply more than 2 applications per year with a minimum retreatment interval of 21 days.”	
Entry Restrictions Liquid Concentrate, Wettable Powder, and Water Dispersible Granule (Dry Flowable) formulations	“Do not allow people or pets to enter the treated area until sprays have dried.”	Directions for use under General Precautions and Restrictions
Entry Restrictions for Granular Formulations	“Do not allow people or pets to enter the treated area until dusts have settled.” [If watering in is required after the application, “do not enter or allow others to enter the treated areas (except those involved in the watering) until the watering-in is complete and the surface is dry.”]	Directions for use under General Precautions and Restrictions

Environmental Hazard Statement	“This pesticide may be toxic to fish, aquatic invertebrates, and aquatic plants. Do not apply directly to water. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Do not contaminate water when disposing of equipment washwaters or rinsate.”	Directions for Use Associated with the Specific Use Pattern
--------------------------------	--	---

¹ PPE that is established on the basis of Acute Toxicity of the end-use product must be compared to the active ingredient PPE in this document. The more protective PPE must be placed in the product labeling. For guidance on which PPE is considered more protective, see PR Notice 93-7.

² If the product contains oil or bears instructions that will allow application with an oil-containing material, the “N” designation must be dropped.

Appendix A. Use Patterns Subject to Reregistration For MCPA (Case 0017)				
Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Food/ Feed Uses			Use Directions and Limitations	
ALFALFA				
Sodium Salt			None	
Spray Aircraft/ Ground	Dormant	0.5 lb	2	1.0 lb
Dimethylamine Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (animals being finished for slaughter).	
Spray Aircraft/Ground/Sprayer	Dormant	0.5 lb	2	1.0 lb
Spray Aircraft/Ground	Foliar	0.23125 lb	2	.4625 lb
Spray Aircraft/Ground/Sprayer	Late fall	0.5 lb	1	0.5 lb
Spray Aircraft/Ground	Late Tillering	0.25 lb	2	0.5 lb
Spray Ground	Tillering	0.23125 lb	2	.4625 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
BARLEY				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter). 14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast Aircraft/Low pressure ground sprayer	Early boot	0.75 lb	2	1.5 lb
Broadcast Aircraft/Ground/Low pressure ground sprayer	Early Jointing	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb
Spot Treatment/Spray Aircraft/Low pressure ground sprayer	Tillering	0.75 lb	2	1.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Dimethylamine salt			14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) prefeeding interval. 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Early boot	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Foliar	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Low pressure ground sprayer	Internode elongation	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb
Low volume spray (concentrate) Aircraft/Low volume ground sprayer	Spring	0.25 lb	1	0.25 lb
Spray Aircraft/Ground	Tiller through boot	0.75 lb	2	3.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer	Tillering	0.75 lb	2	3.0 lb
Isooctyl ester			45 day(s) pregrazing interval. Buffer zone restriction.	
Chemigation/Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Sprinkler irrigation	Internode elongation	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spray Aircraft/Boom sprayer	Postharvest	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spray Aircraft/Boom sprayer	Tillering	0.5 lb	2	1.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
2-Ethylhexyl ester			7 day(s) preforage interval (animals being finished for slaughter). 14 day(s) preforage interval (animals being finished for slaughter). 14 day(s) preforage interval (dairy animals). 14 day(s) pregrazing interval (dairy animals). 14 day(s) preharvest interval (dry hay). 40 day(s) preharvest interval (grain). 45 day(s) pregrazing interval. 57 day(s) preharvest interval. 7 day(s) prefeeding interval. 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals) 7 day(s) pregrazing interval (dairy animals) 7 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) preharvest interval (forage).	
Low volume spray (concentrate)/Spray Aircraft/Ground	Early spring	0.75 lb	1	1.3875 lb
Low volume spray (concentrate)/Spray Aircraft/Ground	Fall	0.4625 lb	1	0.4625 lb
Broadcast/Chemigation/Low volume spray (concentrate)/Spot treatment/Spray Aircraft/Backpack sprayer/Boom sprayer/Ground/Hand held sprayer/Low pressure ground sprayer/Low volume ground sprayer/Sprinkler irrigation	Postemergence	0.75 lb	2	3.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Low volume ground sprayer Geographic allowable: MN MT ND SD	Postharvest	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spot treatment Aircraft/Hand held sprayer/Low volume ground sprayer	Spring	0.6844 lb	1	0.6844 lb
Low volume spray (concentrate)/Spray Aircraft/Ground Low volume ground sprayer	Tillering	0.4875 lb	2	0.975 lb
BARLEY-LEGUME MIXTURE				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter). 14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast/Low volume spray (concentrate) Aircraft/Low pressure ground sprayer	Early jointing	0.5 lb	2	1.0 lb
Spray Aircraft	Tillering	0.25 lb	2	0.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Dimethylamine salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground/Low pressure	Internode elongation	0.24585 lb	2	0.4917 lb
Spray Aircraft/Ground	Late tillering	0.25 lb	2	0.5 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer/Sprayer	Tillering	0.75 lb	2	1.5 lb
CLOVER				
Sodium Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Dormant	0.5 lb	2	1.0 lb
Dimethylamine salt				

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Aircraft/Ground	Dormant	0.5 lb	2	1.0 lb
Spray Aircraft/Ground	Fall	0.4625 lb	1	0.4625 lb
Spray Aircraft/Ground	Foliar	0.23125 lb	2	0.4625 lb
Spray Ground	Late fall	0.4625 lb	1	0.4625 lb
Spray Aircraft/Ground	Late tillering	0.25 lb	2	0.5 lb
Spray Aircraft/Ground	Postemergence	0.4625 lb	2	0.925 lb
Spray Aircraft/Ground	Spring	0.4625 lb	1	0.4625 lb
Spray Ground	Tillering	0.23125 lb	2	0.4625 lb
FLAX				

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Sodium Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer	Before bud Break	0.25 lb	2	0.50 lb
Spray Aircraft/Ground	Postemergence	0.25 lb	2	0.50 lb
Dimethylamine Salt			7 day(s) prefeeding interval on threshings or stubble to meat animals 7 day(s) prefeeding interval. 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Before bud break	0.25 lb	2	0.50 lb
Spray Aircraft/Ground	Boot	0.25 lb	2	0.50 lb
Spray Aircraft/Ground	Foliar	0.25 lb	2	0.50 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
High volume spray (dilute)/Low volume spray (concentrate)/Spray Aircraft/Ground	Postemergence	0.25 lb	2	0.50 lb
Isooctyl ester			Buffer zone restriction.	
Chemigation/Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Sprinkler irrigation	Foliar	0.225 lb	2	0.45 lb
2-Ethylhexyl ester			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals) 7 day(s) pregrazing interval (dairy animals) 7 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) pregrazing interval.	
Low volume spray (concentrate)/Spray Aircraft/Ground	Foliar	0.25 lb	2	0.50 lb
Broadcast/Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Ground Low volume ground sprayer	Postemergence	0.25 lb	2	0.50 lb
GRASS FORAGE/FODDER/HAY				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter).	
Low volume spray (concentrate)/Spray Aircraft/Low pressure ground sprayer	Early jointing	0.93 lb	2	1.86 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Aircraft/Ground	Postemergence	0.93 lb	2	1.86 lb
2-Ethylhexyl ester			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals) 7 day(s) pregrazing interval (dairy animals) 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Established plantings	1.5 lb	2	3.0 lb
Low volume spray (concentrate)/Spray Aircraft/Ground	Fall	1.3875 lb	1	1.3875 lb
Low volume spray (concentrate)/Spray Aircraft/Ground	Spring	1.3875 lb	1	1.3875 lb
GRASS GROWN FOR SEED				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast Aircraft/Low pressure ground sprayer	Spring	1.0 lb	1	1.0 lb
Dimethylamine Salt			7 day(s) preslaughter interval.	

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Aircraft/Ground	Established plantings	2.0 lb	2	4.0 lb
Spray Aircraft/Ground	Spring	0.8775 lb	1	0.8775 lb
Spray Aircraft/Ground	Tillering	0.8775 lb	2	1.755 lb
2-Ethylhexyl ester			7 day(s) prefeeding interval. 7 day(s) pregrazing interval.	
Spray Aircraft/Ground	Established plantings	0.925 lb	2	1.85 lb
Spray Aircraft/Ground	Fall	0.925 lb	1	0.925 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Sprayer	Spring	0.925 lb	1	0.925 lb
LESPEDEZA				
Dimethylamine Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Ground	Tillering	0.23125 lb	2	0.4625 lb
OATS				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter). 14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast Aircraft/Low pressure ground sprayer	Early boot	0.75 lb	2	1.5 lb
Broadcast Aircraft/Ground/Low pressure ground sprayer	Early jointing	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Low pressure ground sprayer	Tiller through boot	0.6975 lb	2	1.395 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Dimethylamine Salt			14 day(s) preforage interval (animals being finished for slaughter). 14 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Early boot	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Foliar	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Low pressure ground sprayer	Internode elongation	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Tiller through boot	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer	Tillering	0.75 lb	2	1.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Isooctyl ester			45 day(s) pregrazing interval. Buffer zone restriction.	
Chemigation/Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Sprinkler irrigation	Internode elongation	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spray Aircraft/Boom Sprayer Rotational/plant back crop restriction. Geographic allowable: MN MT ND SD	Postharvest	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spray Aircraft/Boom sprayer	Tillering	0.5 lb	2	1.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
2-Ethylhexyl ester			7 day(s) preforage interval (animals being finished for slaughter). 14 day(s) preforage interval (animals being finished for slaughter). 14 day(s) preforage interval (dairy animals). 14 day(s) pregrazing interval (dairy animals). 14 day(s) preharvest interval (dry hay). 40 day(s) preharvest interval (grain)l 45 day(s) pregrazing interval. 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals) 7 day(s) pregrazing interval (dairy animals) 7 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) pregrazing interval. 7 day(s) preharvest interval (forage).	
Broadcast/Chemigation/Low volume spray (concentrate)/Spot treatment/Spray Aircraft/Backpack sprayer/Boom sprayer/Ground/Hand held sprayer/Low pressure ground sprayer/ Low volume ground sprayer/Sprinkler irrigation	Postemergence	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Low volume ground sprayer Geographic allowable: MN, MT, ND, SD	Postharvest	0.5 lb	2	1.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Low volume spray (concentrate)/Spray treatment Aircraft/Hand held sprayer/Low volume ground sprayer	Spring	0.6844 lb	1	0.6844 lb
Low volume spray (concentrate)/Spray Aircraft/Ground	Tillering	(L)	2	
OATS-LEGUME MIXTURE				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter). 14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast/Low volume spray (concentrate) Aircraft/Low pressure ground sprayer	Early jointing	0.50 lb	2	1.0 lb
Spray Aircraft	Tillering	0.25 lb	2	0.50 lb
Dimethylamine salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Low pressure	Internode elongation	0.24585 lb	2	0.4917 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Aircraft/Ground	Late tillering	0.25 lb	2	0.50 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure/Low pressure ground sprayer/Sprayer	Tillering	0.5 lb	2	1.0 lb
PASTURES				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter).	
Low volume spray (concentrate)/Spray Aircraft/Low pressure ground sprayer	Established plantings	1.395 lb	2	2.79 lb
Broadcast/Spray Aircraft/Ground/Low pressure ground sprayer	Fall	1.5 lb	1	1.5 lb
Spray Aircraft/Ground	Postemergence	1.395 lb	2	2.79 lb
Broadcast/Spray Aircraft/Ground/Low pressure ground sprayer	Spring	1.5 lb	1	1.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Dimethylamine Salt			21 day(s) preharvest interval (dry hay). 21 day(s) preharvest interval (forage). 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Delayed dormant through bloom	1.5 lb	2	3.0 lb
Spray Aircraft/Ground	Established plantings	1.5 lb	2	3.0 lb
Spray Aircraft/Ground	Fall	1.5 lb	1	1.5 lb
Spray Aircraft/Ground	Foliar	1.5 lb	2	3.0 lb
Broadcast/Spot treatment/Spray Aircraft/Ground	Postemergence	1.5 lb	2	3.0 lb
Spray Aircraft/Ground	Spring	1.5 lb	1	1.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Broadcast/Spot treatment/Spray Aircraft/Ground/High volume ground sprayer/Sprayer	When needed	1.5 lb	2	3.0 lb
2- Ethylhexyl ester			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals) 7 day(s) pregrazing interval (dairy animals) 7 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) pregrazing interval. 7 day(s) prefeeding interval.	
Spot treatment/Spray Aircraft/Ground	Established plantings	1.5 lb	2	3.0 lb
Broadcast/Low volume spray (concentrate)/ Spray Aircraft/Ground	Fall	1.5 lb	1	1.5 lb
Broadcast/Low volume spray (concentrate)/Spray Aircraft/Ground	Spring	1.5 lb	1	1.5 lb
Low volume spray (concentrate)/ Spot Treatment Aircraft/Hand held sprayer/Low volume ground sprayer	When needed	1.5 lb	2	3.0 lb
PEAS (UNSPECIFIED)				
Sodium Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) pregrazing interval (meat animals being finished for slaughter). Geographic allowable: ID or Pacific NW States (Label verbatim) WA	

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Broadcast/Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer	Postemergence	0.375 lb	2	0.75 lb
Spray Aircraft/Ground	Prebloom	0.375 lb	2	0.75 lb
Dimethylamine Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Foliar	0.375 lb	2	0.75 lb
High volume spray (dilute)/Low volume spray (concentrate)/Spray Aircraft/Ground	Postemergence	0.375 lb	2	0.75 lb
Spray Aircraft/Ground	Prebloom	0.3469 lb	2	0.6938 lb
Spray Aircraft/Ground	Tillering	0.25 lb	2	0.50 lb
2-Ethylhexyl ester			Do not allow the feeding or grazing of foliage by livestock. Geographic allowable: Pacific NW States (Label verbatim).	

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Aircraft/Ground	Postemergence	0.375 lb	2	0.75 lb
RANGELAND				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter).	
Low volume spray (concentrate)/Spray Aircraft/Low pressure ground sprayer	Established plantings	1.395 lb	2	2.79 lb
Broadcast/Spray Aircraft/Ground/Low pressure ground sprayer	Fall	1.5 lb	1	1.5 lb
Spray Aircraft/Ground	Postemergence	1.395 lb	2	2.79 lb
Broadcast Spray Aircraft/Ground/Low pressure ground sprayer	Spring	1.5 lb	1	1.5 lb
Dimethylamine Salt			21 day(s) preharvest interval (dry hay). 21 day(s) preharvest interval (forage). 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) preslaughter interval.	

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Aircraft/Ground	Delayed dormant through bloom	1.5 lb	2	3.0 lb
Spray Aircraft/Ground/Sprayer	Fall	1.5 lb	1	1.5 lb
Spray Aircraft/Ground	Foliar	1.5 lb	2	3.0 lb
Broadcast/Spot treatment/Spray Aircraft/Ground	Postemergence	1.5 lb	2	3.0 lb
Spray Aircraft/Ground/Sprayer	Spring	1.5 lb	1	1.5 lb
Broadcast/Spot treatment/Spray Aircraft/Ground/High volume ground sprayer/Sprayer	When needed	1.5 lb	2	3.0 lb
2-Ethylhexyl ester			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals) 7 day(s) pregrazing interval (dairy animals) 7 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) pregrazing interval. 7 day(s) prefeeding interval..	

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spot treatment/Spray Aircraft/Ground	Established plantings	1.5 lb	2	3.0 lb
Broadcast/Low volume spray (concentrate)/Spray Aircraft/Ground	Fall	1.5 lb	1	1.5 lb
Broadcast/Low volume spray (concentrate)/Spray Aircraft/Ground	Spring	1.5 lb	1	1.5 lb
Low volume spray (concentrate)/ Spot treatment Aircraft/Hand held sprayer/Low volume ground sprayer	When Needed	1.5 lb	2	3.0 lb
RYE				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter). 14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast Aircraft/Low pressure ground sprayer	Early boot	0.75 lb	2	1.5 lb
Broadcast Aircraft/Ground/Low pressure ground sprayer	Early jointing	0.75 lb	2	1.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Low pressure ground sprayer	Tiller through boot	0.6975 lb	2	1.395 lb
Dimethylamine Salt			14 day(s) preforage interval (animals being finished for slaughter). 14 day(s) pregrazing interval (dairy animals). 7 day(s) prefeeding interval. 7 day(s) preslaughter interval. 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Early boot	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Foliar	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Low pressure ground sprayer	Internode elongation	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
High volume spray (dilute)/Low volume spray (concentrate) Aircraft/Ground/Low volume ground sprayer	Spring	0.25 lb	1	0.25 lb
Spray Aircraft/Ground	Tiller through boot	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer	Tillering	0.75 lb	2	1.5 lb
Isooctyl ester			45 day(s) pregrazing interval. Buffer zone restriction.	
Chemigation/Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Sprinkler irrigation	Internode elongation	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spray Aircraft/Boom sprayer Rotational/plant back crop restriction. Geographic allowable: MN MT ND SD	Postharvest	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spray Aircraft/Boom sprayer	Tillering	0.5 lb	2	1.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
2-Ethylhexyl ester			14 day(s) preforage interval (animals being finished for slaughter). 14 day(s) preforage interval (dairy animals). 14 day(s) pregrazing interval (dairy animals). 45 day(s) pregrazing interval. 7 day(s) prefeeding interval. 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals) 7 day(s) pregrazing interval (dairy animals) 7 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) pregrazing interval.	
Low volume spray (concentrate)/ Spray Aircraft/Ground	Early spring	0.75 lb	1	0.75 lb
Low volume spray (concentrate)/Spray Aircraft/Ground	Fall	0.4625 lb	1	0.4625 lb
Broadcast/Chemigation/ Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Ground/Low volume ground sprayer/Sprinkler irrigation	Postemergence	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Low volume ground sprayer	Postharvest	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spray Aircraft/Ground	Tillering	0.4875 lb	2	0.975 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
RYE-LEGUME MIXTURE				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter). 14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast/Low volume spray (concentrate) Aircraft/Low pressure ground sprayer Spray Aircraft	Early jointing Tillering	0.5 lb 0.25 lb	2 2	1.0 lb 0.50 lb
Dimethylamine Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Low pressure Spray Aircraft/Ground Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer/Sprayer	Internode elongation Late tillering Tillering	0.24585 lb 0.25 lb 0.5 lb	2 2 2	0.4917 lb 0.50 lb 1.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
SMALL GRAIN-LEGUME MIXTURE				
Dimethylamine Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Low pressure ground sprayer	Tillering	0.23125 lb	2	0.4625 lb
2-Ethylhexyl ester			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Low volume spray (concentrate) Aircraft/Low pressure ground sprayer	Foliar	0.24375 lb	2	0.4875 lb
SMALL GRAINS				
Dimethylamine Salt				
Low volume Spray (concentrate) Aircraft/Ground	Early spring	0.25 lb	1	0.25 lb
TREFOIL				
Dimethylamine Salt				
Spray Aircraft/Ground	Late tillering	0.25 lb	2	0.50 lb
SORGHUM				

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast Aircraft/Low pressure ground sprayer	Early jointing	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb
TRITICALE				
2-Ethylexyl ester			Geographic allowable: OR	
Chemigation/Spray Aircraft/Ground/Sprinkler irrigation	Postemergence	0.24375 lb	2	0.46875
WHEAT				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter). 14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast Aircraft/Low pressure ground sprayer	Early boot	0.75 lb	2	1.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Broadcast Aircraft/Ground/Low pressure ground sprayer	Early jointing	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb
Spot treatment/Spray Aircraft/Low pressure ground sprayer	Tillering	0.75 lb	2	1.5 lb
Dimethylamine Salt			14 day(s) preforage interval (animals being finished for slaughter). 14 day(s) pregrazing interval (dairy animals). 7 day(s) prefeeding interval. 7 day(s) preslaughter interval. 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Aircraft/Ground	Foliar	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer	Internode elongation	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	Postemergence	0.75 lb	2	1.5 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
High volume spray (dilute)/Low volume spray (concentrate)/Spot treatment Aircraft/Ground/Low volume ground sprayer	Spring	0.75 lb	1	0.75 lb
Spray Aircraft/Ground	Tiller through boot	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer	Tillering	0.75 lb	2	1.5 lb
Spray Aircraft/Ground	When needed	0.75 lb	2	1.5 lb
Isooctyl ester			45 day(s) pregrazing interval. Buffer zone restriction.	
Chemigation/Low volume spray (concentrate)/Spray Aircraft/Boom sprayer/Sprinkler irrigation	Internode elongation	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/ Spray Aircraft/Boom sprayer	Postharvest	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/Spray Tillering Aircraft/Boom sprayer Rotational/plant back crop restriction. Geographic allowable: MN MT ND SD	Postharvest	0.5 lb	2	1.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
2-Ethylhexyl ester			7 day(s) preforage interval (animals being finished for slaughter). 14 day(s) preforage interval (animals being finished for slaughter). 14 day(s) preforage interval (dairy animals). 14 day(s) pregrazing interval (dairy animals). 14 day(s) preharvest interval (dry hay). 40 day(s) preharvest interval (grain). 45 day(s) pregrazing interval. 60 day(s) preharvest interval. 7 day(s) prefeeding interval. 7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals) 7 day(s) pregrazing interval (dairy animals) 7 day(s) pregrazing interval (meat animals being finished for slaughter). 7 day(s) pregrazing interval. 7 day(s) preharvest interval (forage).	
Low volume spray (concentrate)/Spray Aircraft/Ground	Early spring	0.75 lb	1	0.75 lb
Low volume spray (concentrate)/Spray Aircraft/Ground	Fall	0.4625 lb	1	0.4625 lb
Broadcast/Low volume spray (concentrate) Aircraft/Boom sprayer/Low volume ground sprayer	Foliar	0.39375 lb	2	0.7875 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Broadcast/Chemigation/Low volume spray (concentrate)/Spot treatment/Spray Aircraft/Backpack sprayer/Boom sprayer/Ground/Hand held sprayer/Low pressure ground sprayer/Low volume ground sprayer/Sprinkler irrigation	Postemergence	0.75 lb	2	1.5 lb
Low volume spray (concentrate)/Spray Aircraft/Hand held sprayer/Low volume ground sprayer Geographic allowable: MN, MT, ND, SD	Postharvest	0.5 lb	2	1.0 lb
Low volume spray (concentrate)/ Spot treatment Aircraft/Hand held sprayer/ Low volume ground sprayer	Spring	0.6844 lb	1	0.6844 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Low volume ground sprayer	Tillering	0.4875 lb	2	0.975 lb
WHEAT-LEGUME MIXTURE				
Sodium Salt			7 days(s) preforage interval (animals being finished for slaughter). 7 days(s) pregrazing interval (meat animals being finished for slaughter). 14 days(s) preforage interval (animals being finished for slaughter). 14 days(s) pregrazing interval (meat animals being finished for slaughter).	
Broadcast/Low volume spray (concentrate) Aircraft/Low pressure ground sprayer	Early jointing	0.5 lb	2	1.0 lb

Site Application Type Application Equipment	Application Timing	Max. Single Application Rate (AE) A	Maximum # Applications per Year	Maximum Yearly Rate
Spray Aircraft	Tillering	0.25 lb	2	1.0 lb
Dimethylamine Salt			7 day(s) preforage interval (animals being finished for slaughter). 7 day(s) preforage interval (dairy animals). 7 day(s) pregrazing interval (dairy animals). 7 day(s) pregrazing interval (meat animals being finished for slaughter).	
Spray Low pressure	Internode elongation	0.24585 lb	2	0.4917 lb
Spray Aircraft/Ground	Late tillering	0.25 lb	2	0.50 lb
Low volume spray (concentrate)/Spray Aircraft/Ground/Low pressure ground sprayer/Sprayer	Tillering	0.5 lb	2	1.0 lb

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
MCPA Acid							
Commercial/ Industrial lawns	1.33	lb A	SC/S	NS	NS	NS	Sprayer //Spray (a)
	.0020	gal 1K sq.ft *C1	SC/S	NS	NS	NS	Controlled droplet applicator //Spray (b)
Commercial/ Institutional/ Industrial Premises/ Equipment (outdoor)	1.2972	lb A	SC/S	NS	NS	NS	Sprayer //Broadcast (a)
Golf Course Turf	1.33	lb A	SC/S	2/1 yr	NS	21	Sprayer //Spray (a)
	.0020	gal 1K sq.ft *C1	SC/S	2/1 yr	NS	21	Controlled droplet applicator //Spray (b)
	.0328	lb 1K sq.ft *C1	G	2/1 yr	NS	21	Spreader //Broadcast (c)
Household/ Domestic Dwellings Outdoor Premises	1.2972	lb A	SC/S	NS	NS	NS	Sprayer //Broadcast (a)
Nonagricultural Uncultivated Areas/ Soils	1.33	lb A	SC/S	NS	NS	NS	Sprayer //Spray (a)
	.0020	gal 1K sq.ft *C1	SC/S	NS	NS	NS	Controlled droplet applicator //Spray (b)
	.0328	lb 1K sq.ft *C1	G	NS	NS	NS	Spreader //Broadcast (c)
Ornamental Lawns and Turf	1.33	lb A	SC/S	NS	NS	NS	Sprayer //Spray (a)
	.0020	gal 1K sq.ft *C2	SC/S	NS	NS	NS	Controlled droplet applicator //Spray (b)
	.0343	lb 1K sq.ft *C2	G	NS	NS	NS	Spreader //Broadcast (c)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
	1	-- (L) *C2	G	NS	NS	28 30 NS	Spreader //Broadcast/ Spot treatment (d)
Recreation Area Lawns	1.33	lb A	SC/S	NS	NS	NS	Sprayer //Spray (a)
	.0020	gal 1K sq.ft *C1	SC/S	NS	NS	NS	Controlled droplet applicator //Spray (b)
	.0328	lb 1K sq.ft *C1	G	NS	NS	NS	Spreader //Broadcast (c)
Recreational Areas	.0262	lb 1K sq.ft *C1	G	NS	NS	30 NS	Spreader //Broadcast (a)
Residential Lawns	1.2972	lb A	SC/S	2/1 yr	NS	21	Sprayer //Broadcast (a)
	.0276	lb 1K sq.ft *K1	G	2/1 yr	NS	21	Spreader //Broadcast (b)
	1	-- (L) *K1	G	2/1 yr	NS	21	Spreader //Spot treatment (c)
Urban Areas	.0276	lb 1K sq.ft *C2	G	NS	NS	30	Spreader //Broadcast (a)
	1	-- (L) *C2	G	NS	NS	30	Spreader //Spot treatment (b)
Use Site/Registration Number(s) for Maximum Dosages with Reg # Codes							
Commercial/ Industrial Lawns				228-228(b), 228-285(a)			
Commercial/ Institutional/ Industrial Premises/ Equipment (Outdoor)				2217-784(a)			
Golf Course Turf				228-228(b), 228-285(a), 228-306(c)			
Household/ Domestic Dwellings Outdoor Premises				2217-784(a)			

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
Nonagricultural Uncultivated Areas/ Soils				228-228(b), 228-285(a), 228-306(c)			
Ornamental Lawns and Turf				228-228(b), 228-285(a), 538-160(d), 538-218(d), 538-222(d), 2217-798(d), 9198-198(c)			
Recreation Area Lawns				228-228(b), 228-285(a), 228-306(c)			
Recreational Areas				228-300(a), 2217-822(a)			
Residential Lawns				2217-784(a), 2217-798(b,c)			
Urban Areas				2217-798(a,b)			
Sodium Salt							
Agricultural Rights-of-Way/ Fence Rows/ Hedgerows	3.2706	lb A	SC/L	NS	NS	NS	Aircraft/ Ground //Spray (a)
	.1289	lb/3 gal *C1	EC	NS	NS	NS	Low pressure ground sprayer //Spot treatment (b)
Agricultural Uncultivated Areas	3.272	lb A	EC	NS	NS	NS	Aircraft/ Low pressure ground sprayer //Broadcast/ Spot treatment (a)
	.1289	lb/3 gal *C1	EC	NS	NS	NS	Low pressure ground sprayer //Spot treatment (b)
Grasses Grown for Seed	1.0902	lb A	SC/L	2/1 yr	NS	21	Aircraft/ Ground //Broadcast (a)
Industrial Areas (Outdoor)	3.094	lb A	EC	NS	NS	NS	Aircraft/ Low pressure ground sprayer //Low volume spray (concentrate) (a)
	.1289	lb/3 gal *C1	EC	NS	NS	NS	Low pressure ground sprayer //Spot treatment (b)
Nonagricultural Rights-of-Way/ Fence Rows/ Hedgerows	3.094	lb A	EC	NS	NS	NS	Aircraft/ Low pressure ground sprayer //Low volume spray (concentrate) (a)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
	.1289	lb/3 gal *C1	EC	NS	NS	NS	Low pressure ground sprayer //Spot treatment (b)
Nonagricultural Uncultivated Areas/ Soils	3.272	lb A	EC	NS	NS	NS	Aircraft/ Low pressure ground sprayer //Broadcast/ Spot treatment (a)
	.1289	lb/3 gal *C1	EC	NS	NS	NS	Low pressure ground sprayer //Spot treatment (b)
Ornamental Lawns and Turf	1.636	lb A	EC	NS	NS	NS	Aircraft/ Low pressure ground sprayer //Broadcast (a)
	.0341	lb 1K sq.ft *C2	SC/L	NS	NS	NS	Ground //Spot treatment (b)
Ornamental Sod Farm (Turf)	1.5	lb A	SC/L	2/1 yr	NS	21	Aircraft/ Ground //Broadcast (a)
	.0341	lb 1K sq.ft *C1	SC/L	2/1 yr	NS	21	Ground //Spot treatment (b)
Use Site/Registration Number(s) for Maximum Dosages with Reg # Codes							
Agricultural Rights-of-Way/ Fence Rows/ Hedgerows				42750-24(b), 62719-58(a)			
Agricultural Uncultivated Areas				5905-510(a), 42750-24(b)			
Grasses Grown for Seed				62719-58(a)			
Industrial Areas (Outdoor)				42750-24(a,b)			
Nonagricultural Rights-of-Way/ Fence Rows/ Hedgerows				42750-24(a,b)			
Nonagricultural Uncultivated Areas/ Soils				5905-510(a), 42750-24(b)			
Ornamental Lawns and Turf				5905-510(a), 62719-58(b)			
Ornamental Sod Farm (Turf)				62719-58(a,b)			
Dimethylamine Salt							

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
Agricultural Fallow/ Idleland	3.6801	lb A	EC	NS	NS	NS	Aircraft/ Ground //Spray (a)
	2.441	lb/.5 gal *C1	EC	NS	3 lb (L)/cc	NS	Ground //Spot treatment (b)
	.1533	lb/3 gal *C1	EC	NS	NS	NS	Ground //Spot treatment (c)
Agricultural Rights-of-Way/ Fence Rows/ Hedgerows	3.673	lb A	SC/L	NS	NS	NS	Ground //Spray (a)
	.1530	lb/3 gal *C1	SC/L	NS	NS	NS	Ground //Spot treatment (b)
Agricultural Uncultivated Areas	3.673	lb A	SC/L	NS	NS	NS	Ground //Spray (a)
	.1530	lb/3 gal *C1	SC/L	NS	NS	NS	Ground //Spot treatment (b)
Airports/ Landing Fields	3.406	lb A	SC/L	NS	NS	NS	Aircraft/ Ground //Spray (a)
	.1419	lb/3 gal *C1	SC/L	NS	NS	NS	Ground //Spot treatment (b)
Commercial/ Industrial Lawns	.1816	lb A	SC/L	NS	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer //Spray (a)
	.0350	lb 1K sq.ft *C1	SC/L	NS	NS	NS	Ground //Spray (b)
Drainage Systems	3.406	lb A	SC/L	NS	NS	NS	Aircraft/ Ground //Spray (a)
	.0788	lb 1K sq.ft *F1	EC	NS	NS	NS	Sprayer //Spray (b)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
	.0034	lb/.234375 gal *F1	EC	2/1 yr	NS	21	Trigger spray bottle //Spot treatment (c)
	.1419	lb/3 gal *F1	SC/L	NS	NS	NS	Ground //Spot treatment (d)
Forest Plantings (Reforestation Programs)(Tree Farms, Tree Plantations, etc.)	4.913	lb A	SC/L	NS	4.913 lb/cc	NS	Aircraft/ Ground/ High volume ground sprayer //Broadcast/ Spot treatment (a)
Forest Trees (All or Unspecified)	1.426	lb A	SC/L	NS	NS	NS	Ground //Spray (a)
Golf Course Turf	.8764	lb A	SC/L	2/1 yr	NS	21	Sprayer //Spray (a)
	.1816	lb A	SC/L	2/1 yr	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer //Spray (b)
	1.5	lb A	EC	2/1 yr	NS	21	Ground //Broadcast/ Spray (c)
	.0400	lb 1K sq.ft *C1	SC/L	2/1 yr	NS	21	Controlled droplet applicator //Spray (d)
	.1538	lb/3 gal *C1	EC	2/1 yr	NS	21	Ground //Spot treatment (e)
Grasses Grown for Seed	1.5	lb A	SC/L	2/1 yr	NS	21	Aircraft/ Ground //Spray (a)
Household/ Domestic Dwellings Outdoor Premises	.0088 lb 1K sq.ft *K1	EC NS	NS 21	Hose-end sprayer/ Sprayer //Broadcast (a)			
Nonagricultural Rights-of-Way/ Fence Rows	.1816	lb A	SC/L	NS	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
Hedgerows							//Spray (a)
	4.913	lb A	SC/L	NS	4.913 lb/cc	NS	Aircraft/ Ground/ High volume ground sprayer //Broadcast/ Spot treatment (b)
	3.6801	lb A	EC SC/L	NS	NS	NS	Aircraft/ Ground/ Sprayer //Spray (c)
	.3194	lb 1K sq.ft *C2	SC/L	NS	NS	NS	Sprayer //Spray (d)
	.0485	lb/1 gal *C2	SC/L	NS	NS	NS	Tank-type sprayer //Spot treatment (e)
	2.441	lb/3 gal *C1	EC	NS	NS	NS	Ground //Spot treatment (f)
Nonagricultural Uncultivated Areas/ Soils	.1816	lb A	SC/L	NS	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer //Spray (a)
	4.913	lb A	SC/L	NS	4.913 lb/cc	NS	Aircraft/ Ground/ High volume ground sprayer //Broadcast/ Spot treatment (b)
	3.6801	lb A	EC	NS	NS	NS	Aircraft/ Ground //Spray (c)
	.3194	lb 1K sq.ft *C1	SC/L	NS	NS	NS	Sprayer //Spray (d)
	.0034	lb/.234375 gal *C1	EC	2/1 yr	NS	21	Trigger spray bottle //Spot treatment (e)
	.0485	lb/1 gal *C1	SC/L	NS	NS	NS	Tank-type sprayer //Spot treatment (f)
	2.441	lb/3 gal *C1	EC	NS	3 lb (L)/cc	NS	Ground //Spot treatment (g)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
	2.441	lb/3 gal *C1	EC	NS	NS	NS	Ground //Spot treatment (h)
Ornamental Lawns and Turf	1.753	lb A	SC/L	2/1 yr	NS	NS	Atomizing type sprayer/ Spinning-disc sprayer/ Sprayer //Low volume spray (concentrate)/ Spray (a)
	.1816	lb A	SC/L	NS	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer //Spray (b)
	2.461	lb A	EC	NS	NS	NS	Ground //Broadcast/ Spray (c)
	.0300	lb 1K sq.ft *C2	RTU	2/cc	NS	30	Hose-end sprayer //Spray (d)
	.6533	lb 1K sq.ft *C2	G	2/1 yr	NS	30	Spreader //Broadcast (e)
	.0520	lb 1K sq.ft *C2	G	NS	NS	30	Spreader //Broadcast (f)
	.0013	lb/.234375 gal *C2	RTU	2/cc	NS	21	Trigger spray bottle //Spot treatment (g)
	.0034	lb/.234375 gal *C2	EC NS	NS 21	Sprayer //Spot treatment (h)		
	.0169	lb/.25 gal *C2	EC	2/cc	NS	28	Sprayer //Spot treatment (i)
	8.250E-04	lb/.25 gal *C2	SC/L	NS	NS	NS	Ground //Spot treatment (j)
	.0126	lb/.5 gal	SC/L	NS	NS	NS	Sprayer

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
		*C2					//Spot treatment (k)
	.0274	lb/1 gal *C2	SC/L	2/1 yr	NS	NS	Sprayer //Spot treatment (l)
	.1538	lb/3 gal *C1	EC	NS	NS	NS	Ground //Spot treatment (m)
	1	-- (L) *C2	PRL RTU	2/cc	NS	21	Aerosol can/ Trigger spray bottle //Spot treatment (n)
	1	-- (L) *C2	RTU SC/L	NS	NS	14 AN NS	Product container/ Sprayer/ Trigger spray bottle //Spot treatment/ Spray (o)
	3.2	fl.oz 1K sq.ft (L) *C2	SC/L	NS	NS	NS	Hose-end sprayer //Broadcast (p)
Ornamental Sod Farm (Turf)	1.5	lb A	SC/L	2/1 yr	NS	21	Atomizing type sprayer/ Spinning-disc sprayer/ Sprayer //Low volume spray (concentrate)/ Spray (a)
	.1816	lb A	SC/L	2/1 yr	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer //Spray (b)
	1.5	lb A	SC/L	2/1 yr	NS	21	Ground //Spray (c)
	.0398	lb 1K sq.ft *C1	SC/L	2/1 yr	NS	21	Controlled droplet applicator //Spray (d)
	.0383	lb 1K sq.ft *C1	SC/L	2/1 yr	NS	21	Sprayer //Spot treatment (e)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
	.0274	lb/1 gal *C1	SC/L	2/1 yr	NS	21	Sprayer //Spot treatment (f)
Paved Areas (Private Roads/ Sidewalks)	3.406	lb A	SC/L	NS	NS	NS	Aircraft/ Ground //Spray (a)
	.1419	lb/3 gal *C2	SC/L	NS	NS	NS	Ground //Spot treatment (b)
Recreation Area Lawns	.1816	lb A	SC/L	NS	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer //Spray (a)
	1.72	lb A	SC/L	NS	NS	NS	Atomizing type sprayer/ Spinning-disc sprayer/ Sprayer //Low volume spray (concentrate)/ Spray (b)
	.0391	lb 1K sq.ft *C1	SC/L	NS	NS	NS	Controlled droplet applicator //Spray (c)
Recreational Areas	.1816	lb A	SC/L	NS	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer //Spray (a)
	1.76	lb A	SC/L	NS	NS	NS	Spinning-disc sprayer/ Spoon //Spray (b)
	.0400	lb 1K sq.ft *C1	SC/L	NS	NS	NS	Controlled droplet applicator //Spray (c)
	.0126	lb/.5 gal *C1	SC/L	NS	NS	NS	Sprayer //Spot treatment (d)
Residential Lawns	.1816	lb A	SC/L	2/1 yr	.3633 lb/cc	10	Hose-end sprayer/ Knapsack sprayer/ Pump-up sprayer //Spray (a)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
	.0166	lb 1K sq.ft *K1	SC/L	2/cc	NS	14	Backpack sprayer/ Knapsack sprayer/ Pump-up sprayer //Broadcast (b)
	.0316	lb 1K sq.ft *K1	SC/L	2/1 yr	NS	21	Pressure sprayer/ Tank-type sprayer //Spray (c)
	.0126	lb/.5 gal *K1	SC/L	2/1 yr	NS	21	Sprayer //Spot treatment (d)
	1	-- (L) *K1	RTU	2/1 yr	NS	14	Trigger spray bottle //Spot treatment (e)
Shelterbelt Plantings	3.673	lb A	SC/L	NS	NS	NS	Ground //Spray (a)
	.1530	lb/3 gal *J1	SC/L	NS	NS	NS	Ground //Spot treatment (b)
Urban Areas	.0335	lb 1K sq.ft *C2	SC/L	NS	NS	NS	Hose-end sprayer //Spray (a)
	.0126	lb/.5 gal *C1	SC/L	NS	NS	NS	Sprayer //Spot treatment (b)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
Use Site/Registration Number(s) for Maximum Dosages with Reg # Codes							
Agricultural Fallow/ Idleland					228-290(b), 1386-587(a,c)		
Agricultural Rights-of-Way/ Fence Rows/ Hedgerows					62719-13(a,b)		
Agricultural Uncultivated Areas					62719-13(a,b)		
Airports/ Landing Fields					1381-104(a,b)		
Commercial/ Industrial Lawns					2217-729(b), 7969-78(a)		
Drainage Systems					228-271(b,c), 1381-104(a,d)		
Forest Plantings (Reforestation Programs)(Tree Farms, Tree Plantations, etc.)					228-296(a)		
Forest Trees (All or Unspecified)					228-143(a)		
Golf Course Turf					228-313(d), 228-371(a), 2217-362(c,e), 7969-78(b)		
Grasses Grown for Seed					228-143(a)		
Household/ Domestic Dwellings Outdoor Premises					2217-785(a)		
Nonagricultural Rights-of-Way/ Fence Rows/ Hedgerows					228-206(d,e), 228-290(f), 228-296(b), 1386-587(c), 5905-502(c), 7969-78(a)		
Nonagricultural Uncultivated Areas/ Soils					228-206(d,f), 228-271(e), 228-290(g,h), 228-296(b), 1386-587(c), 7969-78(a)		
Ornamental Lawns and Turf					228-224(n), 228-272(g), 228-276(d), 228-284(n), 228-310(h,i), 228-324(f), 228-334(o), 228-336(o), 228-349(o,p), 228-351(o), 228-353(f), 228-371(a,l), 239-2634(o), 2217-362(c,m), 2217-732(j), 2217-734(k), 2217-744(e), 2217-792(o), 7969-78(b)		
Ornamental Sod Farm (Turf)					228-371(a,d,f), 7969-78(b), 62719-13(c,e)		
Paved Areas (Private Roads/ Sidewalks)					1381-104(a,b)		
Recreation Area Lawns					228-372(b,c), 7969-78(a)		
Recreational Areas					228-313(b,c), 2217-734(d), 7969-78(a)		
Residential Lawns					2217-733(b), 2217-734(c,d), 2217-792(e), 7969-78(a)		
Shelterbelt Plantings					62719-13(a,b)		
Urban Areas					2217-734(b), 2217-735(a)		

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
2, Ethylhexyl Ester							
agricultural fallow/idleland	1.537	lb A	EC	1/cc	1.537 lb/cc	NS	Aircraft/ Ground/ Low pressure ground sprayer //Broadcast/ Low volume spray (concentrate) (a)
	4.345	lb A	EC	1/cc	NS	NS	Aircraft/ Hand held sprayer/ Low volume ground sprayer //Low volume spray (concentrate)/ Spot treatment (b)
	3	lb A	EC	NS	NS	NS	Aircraft/ Ground //Spray (c)
	.0349	lb 1K sq.ft *C1	EC	1/cc	1.537 lb/cc	NS	Backpack sprayer/ Hand held sprayer //Spot treatment (d)
	.1250	lb/3 gal *C1	EC	NS	NS	NS	Ground //Spot treatment (e)
agricultural rights-of-way/fencerows/hedge rows	4.313	lb A	EC	NS	NS	NS	Aircraft/ Ground //Spray (a)
agricultural uncultivated areas	1.537	lb A	EC	NS	1.537 lb/cc	NS	Low pressure ground sprayer //Broadcast (a)
	4.313	lb A	EC	NS	NS	NS	Aircraft/ Ground //Spray (b)
	.0349	lb 1K sq.ft *C1	EC	NS	1.537 lb/cc	NS	Backpack sprayer/ Hand held sprayer

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
							//Spot treatment (c)
airports/landing fields	1.6575	lb A	EC	2/1 yr	NS	14	Boom sprayer //Broadcast (a)
	.0380	lb 1K sq.ft *C1	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (b)
commercial/industrial lawns	1.6575	lb A	EC	2/1 yr	NS	14	Backpack sprayer //Broadcast (a)
	2.686	lb A	EC	NS	NS	NS	Sprayer //Broadcast/ Spot treatment (b)
	.0380	lb 1K sq.ft *C1	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (c)
	.0313	lb 1K sq.ft *C1	EC	NS	NS	AN	Hand held sprayer //Spot treatment (d)
commercial/institutional/industrial premises/equipment (outdoor)	1.6575	lb A	EC	2/1 yr	NS	14	Boom sprayer //Broadcast (a)
	.0380	lb 1K sq.ft *C1	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (b)
forest trees (all or unspecified)	2.0111	lb A	EC	NS	NS	NS	Aircraft/ Ground //Low volume spray (concentrate)/ Spray (a)
golf course turf	1.5	lb A	EC	2/1 yr	NS	14	Backpack sprayer

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
							//Broadcast (a)
	1.5	lb A	EC	NS	NS	NS	Sprayer //Broadcast/ Spot treatment (b)
	.0380	lb 1K sq.ft *C1	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (c)
	.0360	lb 1K sq.ft *C1	G	NS	NS	30	Spreader //Broadcast (d)
grasses grown for seed	.7735	lb A	EC	NS	.7735 lb/cc	NS	Aircraft/ Boom sprayer/ Low volume ground sprayer/ Sprinkler irrigation //Chemigation/ Low volume spray (concentrate)/ Spray (a)
	1.5	lb A	EC	NS	1.601 lb/cc	AN	Aircraft/ Hand held sprayer/ Low volume ground sprayer //Low volume spray (concentrate)/ Spot treatment (b)
	1.5	lb A	EC	NS	NS	NS	Aircraft/ Ground //Spray (c)
household/domestic dwellings/ outdoor premises	.6575	lb A	EC	2/1 yr	NS	NS	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Broadcast (a)
	.0380	lb 1K sq.ft *K1	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (b)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
nonagricultural rights-of-way/fencerows/hedge rows	4.359	lb A	EC	2/cc	NS	AN	Aircraft/ Ground //Spray (a)
	1.6575	lb A	EC	2/1 yr	NS	14	Boom sprayer //Broadcast (b)
	4.388	lb A	EC	NS	NS	AN	Aircraft/ Ground //Spray (c)
	.0380	lb 1K sq.ft *C2	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (d)
	.0823	lb 1K sq.ft *C1	EC	NS	NS	NS	Sprayer //Spray (e)
	.0256	lb/1 gal *C1	EC	NS	NS	NS	Tank-type sprayer //Spot treatment (f)
	.3584	lb/3 gal *C1	EC	NS	NS	AN	Ground //Spot treatment (g)
	.7500	gal (L) *C1	EC	NS	NS	NS	Ground //Spot treatment/ Spray (h)
nonagricultural uncultivated areas/soils	3.659	lb A	EC	1/cc	NS	NS	Aircraft/ Hand held sprayer/ Low volume ground sprayer //Low volume spray (concentrate)/ Spot treatment (a)
	4.313	lb A	EC	2/cc	NS	AN	Aircraft/ Ground //Spray (b)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
	4.388	lb A	EC	NS	NS	AN	Aircraft/ Ground //Spray (c)
	.0823	lb 1K sq.ft *C1	EC	NS	NS	NS	Sprayer //Spray (d)
	.0256	lb/1 gal *C1	EC	NS	NS	NS	Tank-type sprayer //Spot treatment (e)
	4.332	lb/3 gal *C1	EC	NS	NS	NS	Ground //Spot treatment (f)
	.7500	gal (L) *C1	EC NS	NS NS	Ground //Spot treatment (g)		
ornamental lawns and turf	1.6575	lb A	EC	2/1 yr	NS	14	Backpack sprayer //Broadcast (a)
	2.686	lb A	EC	NS	NS	NS	Sprayer //Broadcast/ Spot treatment (b)
	.0380	lb 1K sq.ft *C2	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (c)
	.0313	lb 1K sq.ft *C1	EC	NS	NS	AN	Hand held sprayer //Spot treatment (d)
ornamental sod farm (turf)	1.6575	lb A	EC	2/1 yr	NS	14	Backpack sprayer //Broadcast (a)
	.5000	lb A	EC	NS	.5 lb/cc	NS	Aircraft/ Ground/ Sprinkler

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
							irrigation //Chemigation/ Spray (b)
	1.5	lb A	EC	NS	NS	AN	Aircraft/ Ground //Broadcast/ Spray (c)
	.0380	lb 1K sq.ft *C1	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (d)
	.0313	lb 1K sq.ft *C1	EC	NS	NS	AN	Hand held sprayer //Spot treatment (e)
recreation area lawns	2.686	lb A	EC	NS	NS	NS	Sprayer //Broadcast/ Spot treatment (a)
	.0360	lb 1K sq.ft *C1	G NS	NS 30	Spreader //Broadcast (b)		
recreational areas	1.6575	lb A	EC	2/1 yr	NS	14	Boom sprayer //Broadcast (a)
	1.093	lb A	EC	NS	NS	NS	Sprayer //Spray (b)
	.0380	lb 1K sq.ft *C1	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (c)
	.0256	lb 1K sq.ft *C1	EC	NS	NS	NS	Low volume sprayer //Low volume spray (concentrate) (d)

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
residential lawns	2.686	lb A	EC	NS	NS	NS	Sprayer //Broadcast/ Spot treatment (a)
	.0360	lb 1K sq.ft *K1	G	NS	NS	30	Spreader //Broadcast (b)
urban areas	1.6575	lb A	EC	2/1 yr	NS	14	Boom sprayer //Broadcast (a)
	.0380	lb 1K sq.ft *C2	EC	2/1 yr	NS	14	Backpack sprayer/ Compression sprayer/ Knapsack sprayer //Spot treatment (b)
Use Site/Registration Number(s) for Maximum Dosages with Reg # Codes							
agricultural fallow/idleland				5905-506(c,e), 62719-86(b), 62719-307(a,d)			
agricultural rights-of-way/fencerows/hedgerows				11685-21(a)			
agricultural uncultivated areas				11685-21(b), 62719-307(a,c)			
airports/landing fields				2217-834(a,b)			
commercial/industrial lawns				2217-803(b), 2217-834(a,c), 62719-59(d)			
commercial/institutional/industrial premises/equipment (outdoor)				2217-834(a,b)			
forest trees (all or unspecified)				228-267(a)			
golf course turf				228-203(d), 2217-803(b), 2217-834(a,c)			
grasses grown for seed				228-267(c), 51036-254(a), 62719-86(b)			
household/domestic dwellings outdoor premises				2217-834(a,b)			
nonagricultural rights-of-way/fencerows/hedgerows				228-205(f), 228-317(e), 1381-98(g), 2217-834(b,d), 9779-265(h), 42750-23(h), 42750-25(h), 71368-16(a), 71368-17(c)			

Use Site	Max. Rate per App.	Max Rate Unit/Area *UG	Form	Max. # Apps. CC & yr	Max. App. Rate/ CC & yr	Min. App Interval (days)	Application Equipment /Type (Reg # Code)
nonagricultural uncultivated areas/soils				228-205(e), 228-317(d), 11685-21(b), 42750-23(f,g), 42750-25(g), 62719-86(a), 71368-17(c)			
ornamental lawns and turf				2217-803(b), 2217-834(a,c), 62719-59(d)			
ornamental sod farm (turf)				264-690(b), 2217-834(a,d), 62719-59(c,e)			
recreation area lawns				228-203(b), 2217-803(a)			
recreational areas				228-205(b,d), 2217-834(a,c)			
residential lawns				228-203(b), 2217-803(a)			
urban areas				2217-834(a,b)			

LEGEND**HEADER ABBREVIATIONS**

Use Site : The use site refers to the entity (crop, building, surface or article) where a pesticide is applied and/or which is being protected.

Max.Rate per App : Maximum dose for a single application to a single site. System calculated.

Max.Rate Unit/Area : Units and Area associated with the maximum dose.

*UG : Use Group codes.

Form : The physical form of the end use product found in the container.

Max. # Apps cc & yr : The maximum number of applications.

Max. App Rate/cc & yr : The maximum amount of pesticide product that can be applied to a site in one growing season (/cc) or during the span of one year (/yr).

Min. App Interval (days): The minimum retreatment interval between applications in days (aggregated).

Application Equipment : The equipment used to apply pesticide (aggregated).

Application Type : The type of pesticide application (aggregated).

Current as of - : The label data for the listed products in this report is current as of this date.

ABBREVIATIONS

AN - As Needed.

NA - Not Applicable.

NS - Not Specified (on label).

(L) - The dosage information provided is from the label in terms of product (e.g., ounces, gallons, or pounds of the product) because there was insufficient information (e.g., missing density, area, or active ingredient percentages) to provide converted dosage information.

~ - The tilde in "Max. Rate per App" indicates a dosage that includes information from a SLN label.

UC - Unconverted due to lack of data (on label).

APPLICATION RATE

W : PPM calculated by weight
V : PPM calculated by volume
U : Unknown whether PPM is given by weight or by volume
cwt : Hundred Weight.
nnE-xx : nn times (10 power -xx), for instance, "1.234E-4" is equivalent to ".0001234".
-- : No description available in LUIS unit conversion vocabulary.
~ : The dosage information includes a contribution from one or more (TQ, CL, BR, I) active ingredients.

FORMULATION CODES

G : Granular
SC/S : Soluble Concentrate/solid

USE GROUP CODES

C1 : TERRESTRIAL NON-FOOD CROP
C2 : TERRESTRIAL NON-FOOD+OUTDOOR RESIDENTIAL
K1 : OUTDOOR RESIDENTIAL

Appendix B
Data Supporting Guideline Requirements for the Reregistration of MCPA

REQUIREMENT		Use Patterns	CITATION(S)
PRODUCT CHEMISTRY			
New Guideline Number	Old Guideline Number		
830.1550	61-1	Product Identity and Composition	A, B, C, K 44645801, 44914027, 43129310, 44484501, 4448502, 43227201, 4322702, 4322703, 4422706, 44401301, 44645801, 42377401, 42577601, 43986101, 44463901, 40470101, 41193401, 42079401, 44645801, 45084401, 44914027, 43129310
830.1600	61-2A	Description of materials used to produce the product	A, B, C, K 44639901, 44394401, 42386401, 42577601, 43986101, 158077, 42377401, 45804402, 4504403
830.1620	61-2B	Description of production process	42079401, 42386401
	61-3	Discussion of Formation of Impurities	45804404
830.1700	62-1	Preliminary Analysis	A, B, C, K 44639901, 45804405, 45804406, 42386402, 42377410, 42450901, 42657101, 44394401, 42079402, 42577602, 43986102, 40470101, 44639901
830.1750	62-2	Certification of limits	A, B, C, K 44645802, 42377401, 42377402, 42377403, 43986102, 42377405, 42377409, 42450901, 42079403, 40470101, 44401301, 42377410
830.1800	62-3	Analytical Method	A, B, C, K 43227203, 42377404, 42377406, 42377407, 42377408, 42577608, 43986102, 44259401, 40470101, 42079403, 42377405, 44463901
	63-0	Reports of Multiple Phys/Chem Characteristics	44484504, 4484503, 4322702, 43227206, 53734

Appendix B
Data Supporting Guideline Requirements for the Reregistration of MCPA

REQUIREMENT			Use Patterns	CITATION(S)
830.6302	63-2	Color	A, B, C, K	42450903, 42450902, 44861801
830.6303	63-3	Physical State	A, B, C, K	42450904
830.6304	63-4	Odor	A, B, C, K	42757301
830.6313	63-13	Stability to normal and elevated temperatures, metals, and metal ions	A, B, C, K	42450907, 42757301
830.700	63-12	pH	A, B, C, K	42450907
830.6317	63-17	Storage Stability		42638601, 45173401, 44484505, 444806, 45480901
830.6320	63-20	Corrosion Characteristics		44861801, 44929001, 44535802
830.7200	63-5	Melting Point	A, B, C, K	42450905
830.7300	63-7	Density	A, B, C, K	42450906
830.7550	63-11	Partition coefficient, shake flask method	A, B, C, K	40470101, 40471801
830.6314	63-14	Oxidation or reducing action		44535801
830.7840	63-8	Solubility	A, B, C, K	40471802
830.7950	63-9	Vapor Pressure	A, B, C, K	40471803
ECOLOGICAL EFFECTS				
850.2100	71-1A	Avian Acute Oral Toxicity	A, B, C, K	40019201
850.2200	71-2A	Avian Dietary Toxicity - Quail	A, B, C, K	40555803, 4055802, Data Gap (MCPA EHE)

Appendix B
Data Supporting Guideline Requirements for the Reregistration of MCPA

REQUIREMENT			Use Patterns	CITATION(S)
850.1075	72-1A	Fish Toxicity Bluegill	A, B, C, K	40062004, 42624402, 41800904, 40062005, 41800901, 41800902, 41800905, 41800901, 41800902, 41800903
850.1010	72-2A	Invertebrate Toxicity	A, B, C, K	41800906, 42412201
850.1075	72-3A	Estuarine/Marine Toxicity - Fish	A, B, C, K	43083210, 40062006, 43086501
850.1300	72-4A	Fish Early Life Stage - Daphnid	A, B, C, K	44407202, 44407201
850.4225	122-1A	Terrestrial Plant Toxicity, Seedling Emergence (Tier 11)	A, B, C, K	43083205, 46148, 43083205, Data Gap (MCPA Acid, DMAS, EHE)
850.4250	122-1B	Terrestrial Plant Toxicity, Vegetative Vigor (Tier II)	A, B, C, K	Data Gap (MCPA Acid, DMAS, EHE)
850.5400	122-2	Aquatic Plant Growth	A, B, C, K	43126502, 42461301, 45554403, 43083207, 43083212, 43083213, 43083214, 43083206, 43083207, 43083208, 45503801, 43083211
850.4225	123-1A	Seedling Germination and Seedling Emergence	A, B, C, K	42698701, 42669304, 43788201, 43257901
850.4400	123-2	Aquatic Plant Growth	A, B, C, K	44903501, 44903502, 44903504, 44903503, 45312207, 44903505 Data Gap (MCPA Acid, DMAS, EHE)
850.3020	141-1	Honey Bee Acute Contact	A, B, C, K	42197801, 42150301, 42197801
TOXICOLOGY				
870.1100	81-1	Acute Oral Toxicity-Rat	A, B, C, K	21972(250090), (248567), 1156458
870.1200	81-2	Acute Dermal Toxicity-Rabbit/Rat	A, B, C, K	156459
870.1300	81-3	Acute Inhalation Toxicity-Rat	A, B, C, K	40053101, 42113103, 156460
870.2400	81-4	Primary Eye Irritation-Rabbit	A, B, C, K	156522

Appendix B
Data Supporting Guideline Requirements for the Reregistration of MCPA

REQUIREMENT			Use Patterns	CITATION(S)
870.2600	81-6	Dermal Sensitization	A, B, C, K	43062806, 40352101, 41613003, 43556801
870.6200	81-8	Acute Neurotoxicity Screen Study	A, B, C, K	43562602, 43556702
870.6300	83-6	Developmental Neurotoxicity Study	A, B, C, K	Data Gap (MCPA EHE)
870.3100	82-1A	Subchronic Oral Toxicity: 90-Day Study Rodent	A, B, C, K	43562601, 165470, 165471, 61368, 106595, 43556802, 43556801, 43556701, 43556801
870.3200	82-2	21-Day Dermal - Rabbit/Rat	A, B, C, K	42715001
870.3465	82-4	90-Day Inhalation-Rat (28-Day abbreviated 90-day protocol)	A, B, C, K	Data Gap (MCPA Acid)
870.6200	82-7	Subchronic Neurotoxicity	A, B, C, K	45889301, 43562601
870.4100	83-1B	Chronic Feeding Toxicity - Non-Rodent	A, B, C, K	40634101, 40792301, 164352
870.3700	83-3A	Developmental Toxicity - Rat	A, B, C, K	42723801, 42723802, 40041701, 44954102, 44954101
870.3700	83-3B	Developmental Toxicity - Rabbit	A, B, C, K	42723802
870.3800	83-4	2-Generation Reproduction - Rat	A, B, C, K	40041701
870.5100	84-2	Bacterial Reverse Gene Mutation	A, B, C, K	42840403, 42860103, 42853504, 40027501, 42860102, 148720, 42624401, 42860101, 148720, 4287001, 42853505, 42853502, 42624401, 42860101, 42853506
870.5375	84-2B	Cytogenetics	A, B, C, K	40027501
870.7485	85-1	General Metabolism	A, B, C, K	43755202, 45595301, 45595302
870.7600	85-3	Dermal Penetration and Absorption	A, B, C, K	46327601, 44192701
870.7200	86-1	Domestic Animal Safety	A, B, C, K	5003259

Appendix B
Data Supporting Guideline Requirements for the Reregistration of MCPA

REQUIREMENT			Use Patterns	CITATION(S)
<u>OCCUPATIONAL/RESIDENTIAL EXPOSURE</u>				
875.1100	231	Estimation of Dermal Exposure, Outdoor Sites		Data Gap (MCPA Acid)
<u>ENVIRONMENTAL FATE</u>				
835.2120	161-1	Hydrolysis	A, B, C, K	42665301
835.2240	161-2	Photodegradation - Water	A, B, C, K	42928101
835.2410	161-3	Photodegradation - Soil	A, B, C, K	43225801
835.4100	162-1	Aerobic Soil Metabolism	A, B, C, K	41586001, Data Gap (MCPA EHE)
835.4400	162-3	Anaerobic Aquatic Metabolism	A, B, C, K	40461901
835.4300	162-4	Aerobic Aquatic Metabolism	A, B, C, K	4055801,4 4239601, 44732401
835.1240	163-1	Leaching/Adsorption/Desorption	A, B, C, K	4259603, Data Gap (MCPA EHE)
835.1410	163-2	Laboratory Volatilization	A, B, C, K	Data Gap (MCPA Acid)
835.6100	164-1	Terrestrial Field Dissipation	A, B, C, K	42134201, 43883001, 43697501, 44026801, 42133901
835.6200	164-2	Aquatic Sediment Field Dissipation Study	A, B, C, K	Data Gap (MCPA Acid)
860.1850	165-1	Confined Rotational Crop	A, B, C, K	40961301
<u>RESIDUE CHEMISTRY</u>				
860.1300	171-4A	Nature of Residue - Plants	A, B, C, K	43575501, 41633, 53734, 43580301
	171-4A2		A, B, C, K	5004272,00041633,43580301
	171-4A3	Nature of Livestock	A, B, C, K	43575501, 43575901, 43915401

Appendix B
Data Supporting Guideline Requirements for the Reregistration of MCPA

REQUIREMENT			Use Patterns	CITATION(S)
860.1300	171-4B	Nature of Residue - Livestock	A, B, C, K	45288701, 43575901, 43575501, 43915401, 5575, 4724, 4787, 4822, 4492, 4627, 4764, 4766, 45288701, 45288701, 4449, 4766
				45288712, 45288707, 45288713, 45288712, 45763101, 45288701, 4624, 4625, 4491, 4993, 43793901, 45288703, 45288708, 4288709, 45288705, 43756401, 45288706, 110363, 5567, 43718401, 43724301, 43724401, 43804601, 45288708, 45763101, 45763102, 45288709, 45288711, 45288702, 45288703, 45288705, 45288708, 45288709, 45288704, 45288712, 45763101, 45763102, 45763103, 45763104, 45763105, 45763106, 45288706 Data Gap (MCPA Acid) Ruminant Feed Study
860.1340	171-4C	Residue Analytical Method - Plants	A, B, C, K	45288710, 45288711, 102704, 4491, 4651, 4491, 4443, 4453, 4473, 78931, 4993, 4655, 4659, 25394, 45288702, 45288703, 45288705, 45288708, 45288709, 102704, 43724301, 43826402, 43724301, 43804601, 45288712, 43764101, 45763101, 45763102, 45763103, 45763104, 45763105, 43724401, 43782401, 43826401, 43826402, 45288710, 45288711, 45763101, 45763102, 45763103, 45763104, 4576105, 45288704, 45288706, 45288710, 45288711, 45288713 Data Gap (need modified method)
860.1380	171-4E	Storage Stability - Plants	A, B, C, K	Data Gap (MCPA Acid)
860.1500	171-4K	Crop Field Trials (Peas)	A, B, C, K	Data Gap (MCPA Acid)
860.1540	171-5	Anticipated Residues	A, B, C, K	4438
860.1850	165-1	Confined Accumulation in 1 Rotational Crops	A, B, C, K	40961301

REQUIREMENT			Appendix B	
Data Supporting C			Use Patterns	CITATION(S)
860.1900	165-2	Field Accumulation in Rotational Crop Study	A, B, C, K	Data Gap (MCPA Acid)

OTHER

Appendix C. Technical Support Documents

Additional documentation in support of this RED is maintained in the OPP docket, located in Room 119, Crystal Mall #2, 1801 South Bell Street, Arlington, VA. It is open Monday through Friday, excluding legal holidays, from 8:30 am to 4 pm.

The docket initially contained preliminary risk assessments and related documents as of August 10, 1998. Sixty days later the first public comment period closed. The EPA then considered comments, revised the risk assessment, and added the formal “Response to Comments” document and the revised risk assessment to the docket on June 16, 1999.

All documents, in hard copy form, may be viewed in the OPP docket room or downloaded or viewed via the Internet at the following site: www.epa.gov/pesticides/reregistration

These documents include:

HED Documents:

1. MCPA: Availability of Risk Assessments. 23-June-2004.
2. MCPA: Summary. 18-June-2004.
3. MCPA: Overview of Risk Assessment. 18-June-2004.
4. MCPA: Revised Human Health Risk Assessment for the RED document. 04-Jun-2004.
5. MCPA: Revised Product and Residue Chemistry Chapter for the Reregistration Eligibility Decision. 03-Jun-2004.
6. MCPA: HED Response to Comments Submitted During 30- Day Registrant Error Correction period. 04-Jun-2004.
7. MCPA: Revised MCPA Acute and Chronic Dietary Exposure Assessments for the Reregistration Eligibility Document. 02-Jun-2004.
8. MCPA: Revised Occupational & Residential Exposure Risk Assessment for the Reregistration Eligibility Document. 11-Jun-2004.
9. MCPA: Appendix A Standard Formula Used for Calculating Occupational & Residential Exposures to MCPA. 08-Jun-2004.
10. MCPA: Appendix B Occupational Handler Exposure Data and Risk Calculations for MCPA. 08-Jun-2004.
11. MCPA: Appendix C Occupational Post Application Risks of MCPA Exposures. 08-Jun-2004.
12. MCPA: Appendix D Residential Handler Exposure Data and Risk Calculations for MCPA. 08-Jun-2004.
13. MCPA: Appendix E MCPA Turf Transferable Residue Data. 08-Jun-2004.
14. MCPA: Appendix F Residential Turf Post Application Risk Assessment for MCPA. 08-Jun-2004.

15. MCPA: Corrected First Report of the Hazard Identification Assessment Review Committee. 29-Oct-2003.
16. MCPA: Toxicology Chapter for RED. 01-Jul-2003.
17. MCPA: Meeting Summary, August 4, 2004. 04-Aug-2004.
18. MCPA: Availability of Reregistration Eligibility Decision Document for Comment. 24-Nov-2004.
19. MCPA: RED Fact Sheet. 29-Oct-2004.
20. MCPA: Reregistration Eligibility Decision for MCPA. 30-Sept-2004.
21. MCPA: Corrected Revised Human Health Risk Assessment for the Reregistration Eligibility Decision Document (RED). 14-Sep-2004.
22. MCPA: Second Revised Occupational and Residential Exposure and Risk Assessment for the Reregistration Eligibility Decision Document (RED). 07-Sep-2004.
23. MCPA: Appendix A. Standard Formulas Used for Calculating Occupational and Residential Exposures to MCPA. 07-Sept-2004.
24. MCPA: Appendix B, Occupational Handler Exposure Data and Risk Calculations for MCPA. 07-Sep-2004.
25. MCPA: Appendix B, MCPA Short term MOEs for Handlers. 07-Sep-2004.
26. MCPA: Appendix C, Occupational Post-Application Risks of MCPA Exposures. 07-Sep-2004.
27. MCPA: Appendix D, Residential Handler Exposure Data and Risk Calculations for MCPA. 07-Sept-2004.
28. MCPA: Appendix E, MCPA Turf Transferable Residue (TTR) Data. 07-Sep-2004.
29. MCPA: Appendix F, Residential Turf Post Application Risk Assessment for MCPA. 07-Sep-2004.
30. MCPA: Revised MCPA Acute and Chronic Dietary Exposure Assessments for the Reregistration Eligibility Decision. 15-Sep-2004.
31. MCPA: Revised Product and Residue Chemistry Chapters for the Reregistration Eligibility Decision. 14-Sep-2004.
32. MCPA: Residues of Concern. 07-Oct-2004.
33. MCPA: 4-chloro-2-Methylphenoxy Acetic acid (MCPA). 06-Oct-2004.
34. MCPA: Evaluation of Revised Application Rates and Dietary Consumption for the 2-methyl-4chlorophenoxyacetic acid (MCPA) Reregistration Eligibility Decision Document. 21-Sep-2004.

EFED Documents

1. MCPA: Response to comments made by MCPA Task Force Three on EFED'S RED Chapter. 14-Apr-2004.
2. MCPA: Revised Environmental Fate and Effects Division Preliminary Risk Assessment for the 2-methyl-4chlorophenoxyacetic acid (MCPA) Reregistration Eligibility Decision Document. 14-Apr-2004.

3. MCPA: Environmental Rate and Effects Division's Risk Assessment for the Reregistration Eligibility Document for 2-methyl-4chlorophenoxyacetic acid (MCPA). 01-Jun-2004.

APPENDIX D: BIBLIOGRAPHY

MCPA General References:

Anderson, A.M, Byrtus, G., Thompson J., Humphries, D., Hill, B., and Bilyk, M., 2002. Baseline Pesticide Data for Semi-Permanent Wetlands in the Aspen Parkland of Alberta. Alberta Environment, Publication No. T/673.

Blomquist, J.D., 2003. Personal Communication.

Blomquist, J.D., Denis, J.M., Cowles, J.L., Hetrick, J.A., Jones, R.D., and Birchfield, N.B. 2001. Pesticides in Selected Water-Supply Reservoirs and Finished Drinking Water 1999-2000: Summary of Results from a Pilot Monitoring Program. USGS Open-File Report 01-456. Baltimore, Maryland 2001.

Dubberly, Dale., Florida Department of Agriculture and Consumer Services (FDOACS), 2003. Personal Communication.

ECOFRAM. 1999. ECOFRAM Terrestrial Draft Report. Ecological Committee on FIFRA Risk Assessment Methods. USEPA, Washington, DC.

Fletcher, J.S., J.E. Nellsen, and T.G. Pfleeger. 1994. Literature review and evaluation of the EPA food-chain (Kenaga) nomogram, an instrument for estimating pesticide residues on plants. Env. Toxicol. Chem. 13:1381-1391.

Feitshans, T.A., 1999. An Analysis of State Pesticide Drift Laws, San Joaquin Agric. L. Rev. 1, 37 (Spring 1999).

Furlong, E.T., Anderson, B.D., Werner, S.L., Soliven, P.P., Coffey, L.J., and Burkhardt, M.R., 2001. Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory - Determination of Pesticides in Water by Graphitized Carbon-Based Solid-Phase Extraction and High-Performance Liquid Chromatography/Mass Spectrometry. USGS Water-Resources Investigations Report 01-4134. Denver, Colorado, 2001.

- Gibson, L. R. and M. Liebman. 2002. Course Material for *Principles of Weed Science*, Agronomy 317, Iowa State University. Website accessed 15 July 2003, http://www.agron.iastate.edu/courses/Agron317/Herbicide_mode_of_action.htm.
- Harrison, S.A., Watschke, T.L., Mumma, R.O., Jarrett, A.R., and Hamilton, G.W. Jr. 1993. Nutrient and pesticide concentrations in water from chemically treated turfgrass. In K. Racke and A. Leslie (editors), *Pesticides in urban environments: Fate and significance*. American Chemical Society (ACS) Symposium Series 1993, #522, p. 191-207.
- Hoerger, F. and E. E. Kenaga. 1972. Pesticide residues on plants: correlation of representative data as a basis for estimation of their magnitude in the environment. *in*: F. Coulston and F. Corte (editors), *Environmental Quality and Safety: Chemistry, Toxicology, and Technology*. Vol I. Georg Thieme Publishers, Stuttgart, West Germany, pp. 9-28.
- Jones, R. D., Breithaupt, J., Carleton, J., Libelo, L., Lin, J., Matzner, R., Parker, R., and Birchfield, N. *Guidance for Use of the Index Reservoir in Drinking Water Exposure Assessments*, November 16, 1999. United States Environmental Protection Agency (USEPA) Office of Pesticide Programs (OPP).
- Kellogg, R.L., Wallace, S., Alt, K., and Goss, D.W. 1998. Potential Priority Watersheds for Protection of Water Quality from Nonpoint Sources Related to Agriculture. United States Department of Agriculture, Natural Resources Conservation Service (NRCS).
- Majewski, M.S. and Capel, P.D. 1995. *Pesticides in the Atmosphere: Distribution, Trends, and Governing Factors*. USGS Series: Pesticides in the Hydrologic System, Volume One in the Series. Ann Arbor, Michigan.
- Mayer, F. L. and M.R. Ellersieck. 1986. *Manual of acute toxicity: Interpretation and data base for 410 chemicals and 66 species of freshwater animals*. United States Department of the Interior, U.S. Fish and Wildlife Service, Resource Publication 160.
- Mineau, P., B. T. Collins, and A. Baril. 1996. On the use of scaling factors to improve interspecies extrapolation of acute toxicity in birds. *Regulatory Toxicology and Pharmacology*. 24:24-29.
- Nagy, K. A. 1987. Field metabolic rate and food requirement scaling in mammals and birds. *Ecological Monographs* 57:111-128.
- Paris, D.F., Steen, W.C., Baughman, G.L., and Barnett, J.T. Jr, 1981. Second-Order Model to Predict Microbial Degradation of Organic Compounds in Natural Waters. *Applied and Environmental Microbiology*, vol. 41, No. 3, p 603-609.

- Paris, D.F., Wolfe, N.L., and Steen, W.C., 1983. Microbial Transformations of Esters of Chlorinated Carboxylic Acids. *Applied and Environmental Microbiology*, vol. 47, No. 1, p 7-11.
- Rawn, D.F.K., Halldorson, T.H.J., Lawson, B.D., and Muir, C.G., 1999. A Multi-Year Study of Four Herbicides in Air and Precipitation from a Small Prairie Watershed. *J. Environ. Qual.* 28:898-906.
- Smith, A.E. and Hayden B.J., 1980. Hydrolysis of MCPA Esters and the Persistence of MCPA in Saskatchewan Soils. *Bull. Environm. Contam. Toxicol.*, 25, 369-373.
- Steen, W.C. 1991. Microbial Transformation Rate Constants of Structurally Diverse Man-made Chemicals. U.S. Environmental Protection Agency, Athens GA. EPA/600/3-91/016.
- Swarzenbach, R.P., Gschwend, P.M., and Imboden, D.M., 1993. *Environmental Organic Chemistry*. John Wiley and Sons, Inc. New York.
- Thelin, G.P. and Gianessi, L.P. 2000. Method for Estimating Pesticide Use for County Areas of the Conterminous United States. USGS Open-File Report 00-250, Sacramento, California 2000.
- USEPA, 2002. Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides Input Parameter Guidance. Version II February 28, 2002. U.S. Environmental Protection Agency, Office of Pesticide Programs, Environmental Fate and Effects Division.
- USEPA. 1993. Wildlife Exposure Factors Handbook. Office of Research and Development, Washington, D.C. EPA/600/R-93/187. December 1993.
- USEPA, 1999. Applying a Percent Crop Area Adjustment to Tier 2 Surface Water Model Estimates for Pesticide Drinking Water Exposure Assessments. U.S. Environmental Protection Agency, Office of Pesticide Programs, Environmental Fate and Effects Division.
- USEPA, 1992. Pesticides in Ground Water Database: A Compilation Of Monitoring Studies: 1971-1991, *National Summary*. EPA 734-12-92-001. Washington, D.C. September 1992.
- Wolfe, N.L. 1990. Abiotic Transformations of Toxic Organic Chemicals in the Liquid Phase and Sediments. In: *Toxic Organic Chemicals in Porous Media*. Z. Gerstl, Y. Chen, U. Mingelgrin and B. Yaron. (Eds.). Springer-Verlag, New York. p. 136-147.
- Wolfe, N.L., M.E-S. Metwally and A.E. Moftah. 1989. Hydrolytic Transformations of Organic Chemicals in the Environment. In: *Reactions and Movement of Organic Chemicals in Soils*. B.L.

Sawhney and K. Brown, (Eds), Soil Science Society of America and American Society of Agronomy, Madison, WI. p. 229-242.

PC Code 030501:

1. MRID

Citation Reference

-
- | | |
|------|--|
| 4438 | <u>Miller, P.W.; Jensen, D.J. (1973) Study of Alkaline Hydrolysis for Determination of Residues of MCPA and 2-Methyl-4-chlorophenol in Milk: Report No. GH-C 628. Method dated Feb 13, 1973. (Unpublished study received on unknown date under 9F0761; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:092000-C)</u> |
| 4443 | <u>Thornburg, W. (1973) MCPA Residues in Peas: A Summary of Residue Data. (Unpublished study received on unknown date under 9F0761; prepared by Del Monte Corp., submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:092000-D)</u> |
| 4453 | <u>Winterlin, M.; Radosivich, S.R. (1974) Report of Analysis: Environmental Toxicology Report No. 3445. Includes undated method. (Unpublished study received Feb 10, 1976 under 6E1746; prepared by Univ. of California--Davis, Dept. of Environmental Toxicology, submitted by Interregional Research Project No. 4, New Brunswick, N.J.; CDL:095368-C)</u> |
| 4473 | <u>Frost, K.R., Jr. (1966) Weed Control Headlines 1965-1966. (Unpublished study received Nov 6, 1967 under 464-398; prepared by South Dakota State Univ., submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:003622-R)</u> |
| 4491 | <u>Herman, J.L.; Bjerke, E.L.; Getzendaner, M.E. (1970) Residue of 2-Methyl-4-chlorophenoxyacetic acid and 2-Methyl-4-chlorophenol in Milk and Cream from Cows Fed MCPA. (Unpublished study received Jan 11, 1971 under 9F0761; prepared by Dow Chemical Co., submitted by National Agricultural Chemicals Association, Industry Task Force on Phenoxy Herbicide Tolerances, Washington, D.C.; CDL:091313-I)</u> |
| 4492 | <u>Herman, J.L.; Bjerke, E.L. (1970) Determination of MCPA and 2-Methyl-4-chlorophenol in Milk and Cream by Gas Chromatography. Method no. ACR 70.17 dated Dec 2, 1970. (Unpublished study received Jan 11, 1971 under 9F0761; prepared by Dow Chemical Co., submitted by National Agricultural Chemicals Association, Industry Task Force on Phenoxy Herbicide Tolerances, Washington, D.C.; CDL:091313-J)</u> |
| 4493 | <u>Amchem Products, Incorporated (1968) Summary of Performance Data: Brominal</u> |

Plus]. Summary of studies 002199-B through 002199-P. (Unpublished study received Oct 30, 1968 under 264-239; submitted by Union Carbide Agricultural Products Co., Ambler, Pa.; CDL:002199-A)

- 4624 Herman, J.L.; Bjerke, E.L.; Getzendaner, M.E. (1971) Residues of 2-Methyl-4-chlorophenoxyacetic acid and 2-Methyl-4-chlorophenol in Milk and Cream from Cows Fed MCPA. (Unpublished study received Oct 11, 1971 under 9F0761; prepared by Dow Chemical Co., submitted by National Agricultural Chemicals Association, Industry Task Force on Phenoxy Herbicide Tolerances, Washington, D.C.; CDL:091311-E)
- 4625 Bjerke, E.L.; Herman, J.L. (1971) Residues of 2-Methyl-4-chlorophenoxyacetic acid and 2-Methyl-4-chlorophenol in Tissues of Beef Calves Fed MCPA. (Unpublished study received Oct 11, 1971 under 9F0761; prepared by Dow Chemical Co., submitted by National Agricultural Chemicals Association, Industry Task Force on Phenoxy Herbicide Tolerances, Washington, D.C.; CDL:091311-F)
- 4626 Bjerke, E.L.; Herman, J.L. (1971) Residues of 2-Methyl-4-chlorophenoxyacetic acid and 2-Methyl-4-chlorophenol in Tissues of Sheep Fed MCPA. (Unpublished study received Oct 11, 1971 under 9F0761; prepared by Dow Chemical Co., submitted by National Agricultural Chemicals Association, Industry Task Force on Phenoxy Herbicide Tolerances, Washington, D.C.; CDL:091311-G)
- 4651 Higham, J.W.; Feeny, R.W. (1974) Avenge^(R)I (CL 84,777): Determination of MCPA (2-Methyl-4-chlorophenoxyacetic acid) Residues in Wheat Grain and Straw Following Ground, Postemergence Application in Combination with Avenge (1,2-Dimethyl-3,5-diphenyl pyrazolium methyl sulfate), (Oregon): Report No. C-576. (Unpublished study received Nov 14, 1975 under 6F1703; prepared in cooperation with State Univ. of New York--Oswego, Lake Ontario Environmental Laboratories, submitted by American Cyanamid Co., Princeton, N.J.; CDL:094738-Y)
- 4655 Elenewski, C.A.; Wang, T. (1975) Avenge^(R)I (CL 84,777): Determination of CL 84,777 (1,2-Dimethyl-3,5-diphenyl-1H-pyrazolium methyl sulfate), Bromoxynil (3,5-Dibromo-4-hydroxybenzonitrile) and MCPA (2-Methyl-4-chlorophenoxyacetic acid) Residues in Durum Wheat Grain and Straw Following Aerial Application of Avenge Alone and in Combination with MCPA or Bromoxynil, (Minnesota): Report No. C-823. (Unpublished study received Nov 14, 1975 under 6F1703; prepared in cooperation with Biodynamics, Inc., submitted by American Cyanamid Co., Princeton, N.J.; CDL:094738-AD)
- 4659 Elenewski, C.A.; Wang, T. (1975) Avenge^(R)I (CL 84,777): Determination of CL 84,777 (1,2-Dimethyl-3,5-diphenyl-1H-pyrazolium methyl sulfate), Bromoxynil (3,5-

- Dibromo-4-hydroxylbenzonitrile) and MCPA (2-Methyl-4-chlorophenoxyacetic acid) Residues in Wheat Grain and Straw Following Ground Application of Avenge Alone and in combination with MCPA or Bromoxynil, (Oregon): Report No. C-820. (Unpublished study received Nov 14, 1975 under 6F1703; prepared in cooperation with Biodynamics, Inc., submitted by American Cyanamid Co., Princeton, N.J.; CDL:094738-AH)
- 4724 St. John, L.E., Jr. (1967) MCPA. Pages 445-454, In Analytical Methods for Pesticides, Growth Regulators and Food Additives: Volume 5. Edited by G. Zweig. New York: Academic Press. (Also in unpublished submission received Sep 12, 1968 under 8F0676; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:092980-AP)
- 4787 Guardigli, A. (1974) Rhodia Analytical Method No. 123. Includes two methods dated March 1974. (Unpublished study received Jan 30, 1976 under 359-534; prepared by Rhodia, Inc., submitted by Rhone-Poulenc, Inc., Monmouth Junction, N.J.; CDL:222737-A)
- 4822 Guyton, C.L. (1977) Procedures for the Measurement of Asulam, MCPA, Sulfanilamide and Acetylasulam in/on Flax: Forages, Straw, Seed and Mill-Processed Flax Seed Fractions. Method no. 143 dated Jul 1977. (Unpublished study received Apr 13, 1979 under 359- 662; prepared by Rhodia, Inc., submitted by Rhone-Poulenc, Inc., Monmouth Junction, N.J.; CDL:238025-B)
- 4993 IR-4 Project at Rutgers, the State University (1974) MCPA--Sorghum Residue Studies. (Unpublished study received Oct 3, 1975 under 6E1681; CDL:097351-A)
- 5575 Montgomery, M.L. (1970) MCPA Residue in Wheat: Oregon State University Report. Includes methods dated Jun 17, 1970 and Apr 1, 1970. (Unpublished study including summary report and letters dated Apr 2, 1970 from M.L. Montgomery to Don T. Lillie and J.A. Ignatoski, received Jan 22, 1971 under 9F0761; prepared by Oregon State Univ., Dept. of Agricultural Chemistry, submitted by National Agricultural Chemicals Association, Industry Task Force on Phenoxy Herbicide Tolerances, Washington, D.C.; CDL:091308-I)
- 21972 Raltech Scientific Services, Incorporated (1979) Oral Defined LD50. (Unpublished study received Jul 16, 1979 under 39335-1; submitted by Fallek-Lankro Corp., Tuscaloosa, Ala.; CDL:238870-B)
- 25394 Rydlich, D.; Wallace, K.; Beck, B.; et al. (1976) Residue Results: Banvel plus Bromoxynil plus MCPA Tank Mix: Summary. (Unpublished study received Feb 18, 1976 under 876-25; prepared in cooperation with Oregon State Univ., submitted by Velsicol Chemical Corp., Chicago, Ill.; CDL:225197-C)

- 41633 Keller, W.; Otto, S. (1979) Investigations into the Metabolism of MCPA in Winter Wheat: Report No. 1611a. (Unpublished study including submitter summary, received Aug 28, 1980 under 2217-EX- 2; prepared by BASF, AG, submitted by PBI-Gordon Corp., Kansas City, Kans.; CDL:243167-A)
- 46148 Interregional Research Project Number 4 (1980) Summary of Residue Data for MCPA in or on Forage Legumes Seeded with Small Grains. Includes two undated methods entitled: Analysis of 2-Methyl-4- chlorophenoxyacetic acid from oats and alfalfa; 2-Methyl-4- chlorophenol on oats and alfalfa. (Unpublished study received Nov 5, 1980 under 6E1856; CDL:099690-A)
- 53734 Akzo Zout Chemie Nederland, B.V. (1975) MCPA: Some Information on Properties, Applications, Stability and Toxicity. Summary of studies 231352-B through 231352-D, 231352-N, 231352-O, 231352-Q through 231352-T, 231355-D, 231355-F through 231355-K, 231355-M through 231355-R, 231355-U, 231355-Y and 231355-Z. (Unpublished study received Aug 15, 1977 under 38117-3; CDL:231355-A)
- 61368 Reuzel, P.G.J.; van der Heijden, C.A.; van Oostrum, E.C.M. (1978) Range-Finding (4-Week) Toxicity Study with MCPA in Beagle Dogs: Report No. R 5369. Final rept. (Unpublished study received Nov 3, 1980 under 2217-EX-2; prepared by Centraal Instituut voor Voedingsonderzoek, TNO, submitted by PBI-Gordon Corp., Kansas City, Kans.; CDL:243634-A, 243633)
- 78931 Rohm & Haas Company (1978) Treatment and MCPA Residue Summary for Barley & Oats. (Unpublished study received Jul 14, 1981 under 707-75; CDL:070183-B)
- 102704 National Agricultural Chemicals Assoc. (1973) The Results of Tests on the Amount of Residue Remaining, Including a Description of the Analytical Method Used: (2,4-D). (Compilation; unpublished study received Sep 7, 1973 under 8F0670; CDL:092143-A)
- 106595 Reuzel, P.; Hendriksen, C.; Feron, V.; et al. (1980) Subchronic (13-week) Oral Toxicity Study of MCPA in Beagle Dogs: Report No. R 6478. Final rept. (Unpublished study received Jul 6, 1982 under unknown admin. no.; prepared by Centraal Instituut Voor Voedingsonderzoek, TNO, Neth., submitted by Diamond Shamrock Agricultural Chemicals, Cleveland, OH; CDL:247854-A; 247855; 247856)
- 115682 Bach, K. (1974) Acute Oral Toxicity in Rats of Weedar MCPA Concentrate: Contract No. 121-2320-54. Final rept. (Unpublished study received Oct 18, 1982

under 264-47; prepared by Affiliated Medical Research, Inc., submitted by Union Carbide Agricultural Products Co., Inc., Research Triangle Park, NC; CDL:248567-C)

- 148720 Engelhardt, G. (1985) Cytogenetic Investigations in Chinese Hamsters after a Single Oral Administration of MCPA: [(4-Chloro- 2-methylphenoxy Acetic Acid)]: Sister Chromatid Exchange (SCE): Project No. 16M0046/8356: Supplementary Study. Unpublished study prepared by BASF AG. 32 p.
- 155099 BASF Wyandotte Chemical Co. (1985) Product-specific Data Requirements for MCPA Manufacturing Use Products. Unpublished compilation. 33 p.
- 155743 Gilmore, Inc. (1985) [Product Chemistry Data for MCPA Technical Acid]. Unpublished study. 84 p.
- 158077 A. H. Marks & Co., Ltd. (19??) Manufacturing Process for MCPA Technical Acid. Unpublished compilation. 10 p.
- 158078 A. H. Marks & Co., Ltd. (19??) Analysis and Certification of Product Ingredients [of MCPA]. Unpublished study. 2 p.
- 159470 Rhone-Poulenc Inc. (1986) Product Chemistry Data Requirements under EPA Pesticide Assessment Guidelines Dated Oct. 1982: 2-(4- Chloro-2-methylphenoxy) Acetic Acid, MCPA Tech.: ECD/JBU/LMC/ 2108. Unpublished compilation. 136 p.
- 164352 Hellwig (1986) Report on the Study of the Toxicity of MCPA in Beagle Dogs after 12-month Administration in the Diet: Project No. 33D0046/8341. Unpublished study prepared by BASF Institute. 691 p.
- 165470 Kirsch, P. (1985) Report on the Study of the Toxicity of MCPA in Mice after 4-weeks Administration in the Diet (Range-finding Study): [To Determine Dosage for a 78-week Oncogenicity Study]: Project No. 50S0046/8342. Unpublished study prepared by BASF Ag. 177 p.
- 165471 Kirsch, P. (1985) Report on the Study of the Toxicity of MCPA in Rats after 3 Months Administration in the Diet: [Range-finding Study for 2-year Oncogenicity Study in Rats]: Project No. 31S0046/8302. Unpublished study prepared by BASF Ag. 381 p.

- 250090 (128268) Wolfe, G.; Shults, S.; Killeen, J.; et al. (1982) Acute Dermal Toxicity Study in Albino Rabbits with 2-Methyl-4-chlorophenoxyacetic Acid (MCPA): Report Document No. 520-5TX-81-0158-002. Primary Dermal and Eye Irritation Study in Albino Rabbits with 2-Methyl-4-chlorophenoxyacetic Acid (MCPA): Report Document No. 520-5TX-81-0160-002. Primary Oral Toxicity (LD₅₀) Study in Rats with 2-Methyl-4-chlorophenoxyacetic Acid (MCPA): Report Document No. 520-TX-81-0157-002. (Un- published study received May 2, 1983 under 39335-4; prepared in cooperation with Hazleton Laboratories America, Inc., submitted by Diamond Shamrock Agricultural Chemicals, Tuscaloosa, AL; CDL: 250090-A)
- 5003259 Bjerke, E.L.; Herman, J.L.; Miller, P.W.; Wetters, J.H. (1972) Residue study of phenoxy herbicides in milk and cream. *Journal of Agricultural and Food Chemistry* 20(5):963-967.
- 40019201 Grimes, J. (1986) MCPA Acid: An Acute Oral Toxicity Study with the Bobwhite: Final Report: Wildlife International Ltd. Project No. 222-101. Unpublished study prepared by Wildlife International Ltd. 19 p.
- 40027501 Gelbke, H.; Engelhardt, G. (1986) Cytogenetic Investigations in Chinese Hamsters after a Single Oral Administration of MCPA: Bone Marrow Chromosomes Analysis: Project No. 10M0046/8367. Un- published study prepared by BASF Aktiengesellschaft. 55 p.
- 40041701 MacKenzie, K. (1986) Two-Generation Reproduction Study with MCPA in Rats: Final Report: Study No. 6148-100. Unpublished study prepared by Hazleton Laboratories America, Inc. 1304 p.
- 40053101 Klimisch, H. (1986) Acute Inhalation Toxicity LC50 4 Hours (Rat) Dust Aerosol Study of MCPA: Project No. 13I0046/83. Unpublished study prepared by BASF Aktiengesellschaft. 19 p.
- 40461901 Obrist, J. (1987) Anaerobic Aquatic Metabolism of MCPA: Laboratory Project ID: HLA 6015-325. Unpublished study prepared by Hazle- ton Laboratories America, Inc. 75 p.
- 40470101 May & Baker Ltd. (1987) Addendum to Product Chemistry Data Requirements Under EPA Pesticide Assessment Guidelines ...: 2-(4-chlo- ro-2- methylphenoxy)acetic Acid, MCPA Technical: Lab. Proj. ID ECD/JBU/LMC/2108. Unpublished study. 32 p.
- 40471801 Bailey, R.; Hopkins, D. (1987) 2-Methyl-4-chlorophenoxyacetic Acid: Determination of Octanol/Water Partition Coefficient: Lab. Proj. ID ES-DR-0004-9672-4. Unpublished study prepared by Dow Chemi- cal Co. 13 p.

- 40471802 Hopkins, D. (1987) 2-Methyl-4-Chlorophenoxyacetic Acid: Determination of the Water Solubility: Lab. Proj. ID ES-DR-0004-9672-3. Unpublished study prepared by Dow Chemical Co. 14 p.
- 40471803 Chakrabarti, A.; LaBean, M. (1985) Vapor Pressure of MCPA and Two MCPA Esters: Lab. Proj. ID ML-AL-85-40005. Unpublished study prepared by Dow Chemical Co. 13 p.
- 40555801 Goodwin, P.; Laskowski, D. (1988) An Adsorption Study of MCPA: Project No. GH-C 1995. Unpublished study prepared by Dow Chemical Co. U.S.A. 51 p.
- 40634101 Kirsch, P. (1986) Report: Study on the Chronic Toxicity and Oncogenic Potential of MCPA in Rats: Final Report: Project No. 71S0046/8345. Unpublished study prepared by BASF Ag. 2026 p.
- 40792301 Kuhborth, B. (1986) Report: Study on the Oncogenic Potential of MCPA in Mice: Project No. 80S0046/8358. Unpublished study prepared by BASF AG. 1067 p.
- 40961301 Ewing, D. (1988) MCPA Confined Accumulation Study on Rotational Crops: Proj. ID PAL-EF-86-31. Unpublished study prepared by Analytical Development Corp. 149 p.
- 41193401 Unsworth, J. (1985) Product Chemistry Data Requirements Under EPA Pesticide Assessment Guidelines ... 2-(4-Chloro-2-methylphenoxy) Acetic Acid MCPA Technical: Proj. ID ECD/KBU/LMC/2108. Unpublished compilation prepared by Rhone-Poulenc Ltd. 75 p.
- 41586001 Matt, F. (1990) Aerobic and Aerobic/Anaerobic Soil Metabolism of 14 C]-MCPA: Lab Project Number: HLA 6237-107. Unpublished study prepared by Hazleton Labs America, Inc. 120 p.
- 41759403 Buddle, G. (1990) 4-Chloro-2-Methylphenoxyacetic acid 2-Ethylhexyl Ester: Product Identity and Composition: Lab Project Number: P- 90-275. Unpublished study prepared by Rhone-Poulenc Agriculture Ltd. 29 p.
- 42079400 Akzo Salt and Basic Chemicals BV (1991) Submission of Data to Support the Reregistration Standard for Phenoxy Herbicides (MCPA): Product Chemistry Data. Transmittal of 4 Studies.
- 42079401 Rausch, L. (1991) Product Chemistry for MCPA. Unpublished study prepared by Akzo Chemicals Inc. 72 p.
- 42079402 Bicking, M. (1991) Preliminary Analysis of MCPA Technical Acid: Lab Project Number: 61-91-ACC.15. Unpublished study prepared by Twin City Testing Corp.

57 p.

- 42079403 Rausch, L. (1991) Product Chemistry for MCPA. Unpublished study prepared by Akzo Chemicals Inc. 13 p.
- 42079404 Bicking, M. (1991) Determination of Seven Product Chemistry Parameters for MCPA Technical Acid: Lab Project Number: 53-91-ACC.7. Unpublished study prepared by Twin City Testing Corp. 49 p.
- 42134001 Silvoy, J. (1991) LX143-04 (MCP Ester): Field Dissipation--Terrestrial--on Small Grains in California: Lab Project Number: 6237- 118C: 1641-88-43-04-06K-04. Unpublished study prepared by Hazleton Labs America, Inc. in coop. with Research for Hire. 358 p.
- 42134101 Silvoy, J. (1991) LX143-04 (MCP Ester) Field Dissipation--Terrestrial on Bare Ground: Lab Project Number: 6237-118D: 1641-88-43-04- 21E-03. Unpublished study prepared by Hazleton Labs America, Inc. in coop with Northwest Agricultural Research, Inc. 369 p.
- 42197801 Hoxter, K.; Lynn, S. (1992) MCPA 2-EHE: An Acute Contact Toxicity Study with the Honey Bee: Lab Project Number: 222-101. Unpublished study prepared by Wildlife International Ltd. 30 p.
- 42377401 Pryce, A. (1992) MCPA Acid (TGAI)--Product Chemistry: Final Report: Lab Project Number: AHM/EPA/92/AP/02. Unpublished study prepared by A. H. Marks & Co. Ltd. 41 p.
- 42377402 Anon. (1992) Beginning Materials--Data Sheets from Suppliers: (MCPA Acid (TGAI)--Product Chemistry). Unpublished study prepared by A.H. Marks & Co. Ltd. 48 p.
- 42377403 A. H. Marks and Co., Ltd. (1992) Beginning Materials--A H Marks' Purchase Specifications: (MCPA Acid (TGAI)--Product Chemistry). 12 p.
- 42377404 A H Marks and Co., Ltd. (1992) A H Marks' Standard Analytical Methods: (MCPA Acid (TGAI)--Product Chemistry). Unpublished study. 28 p.
- 42377405 Pryce, A. (1992) Confirmation of Identity of Impurity Standards by GC/MS: Lab Project Number: D92/2. Unpublished study prepared by A H Marks & Co. Ltd. 25 p.
- 42377406 Anon. (1992) Statistical Analysis of PCOC Quality Data (Histograms). Unpublished study prepared by A H Marks & Co. Ltd. 15 p.

- 42377407 Anon. (1992) MCPA Acid (TGAI) Product Specification. Unpublished study prepared by A H Marks & Co. Ltd. 5 p.
- 42377408 Anon. (1992) MCPA Acid (TGAI) Statistical Analysis of QC Data (3 Months to June 1992). Unpublished study prepared by A H Marks & Co. Ltd. 20 p.
- 42377409 Welch, J. (1992) MCPA Acid (TGAI) Determination of Ash, Sodium, Chloride and Sulfate: Lab Project Number: BL4/0481. Unpublished study prepared by Butterworth Labs, Ltd. 46 p.
- 42377410 Anon. (1992) Protocol: Sampling of MCPA: EPA 91/005. Unpublished study prepared by A H Marks & Co. Ltd. 13 p.
- 42386400 Rhone-Poulenc Ag Comp. (1992) Submission of Product Chemistry Data in Support of Reregistration for MCPA. Transmittal of 3 studies.
- 42386401 Snell, R. (1990) MCPA Technical: Supplemental Data for Product Chemistry Series 61: Lab Project Number: ACD/GCB/MS/8762. Unpublished study prepared by Rhone-Poulenc Agriculture Ltd. 26 p.
- 42386402 Buddle, G.; Patel, P. (1991) 4-chloro-2-methylphenoxyacetic acid (MCPA) Analysis and Certification of Product Ingredients, Provision of Supplementary Analytical Method Validation: Lab Project Number: P-91-055. Unpublished study prepared by Rhone-Poulenc Agriculture Ltd. 14 p.
- 42386403 Buddle, G.; Mills, E. (1990) MCPA Technical: Physical Properties: Product Chemistry Series 63-2 to 63-7: Lab Project Number: D AG. 1542. Unpublished study prepared by Rhone-Poulenc Agriculture Ltd. 9 p.
- 42450901 Alexander, B.; Dinwoodie, N.; Maclean, K. (1992) Product Chemistry of MCPA-Acid Analysis: Lab Project Number: 351616: 8655. Unpublished study prepared by Inveresk Research Intl. 74 p.
- 42450902 Dinwoodie, N. ; Maclean, K. (1992) Product Chemistry of MCPA-Acid: Colour: Lab Project Number: 351621: 8541. Unpublished study prepared by Inveresk Research Intl. 15 p.
- 42450903 Dinwoodie, N. ; Maclean, K. (1992) Product Chemistry of MCPA-Acid: Physical State: Lab Project Number: 351637: 8551. Unpublished study prepared by Inveresk Research Intl. 15 p.
- 42450904 Dinwoodie, N.; Maclean, K. (1992) Product Chemistry of MCPA-Acid: Odour: Lab Project Number: 351642: 8552. Unpublished study prepared by Inveresk Research Intl. 15 p.

- 42450905 Dinwoodie, N.; Maclean, K. (1992) Product Chemistry of MCPA-Acid: Melting Point: Lab Project Number: 351658: 8553. Unpublished study prepared by Inveresk Research Intl. 15 p.
- 42450906 Alexander, B.; Dinwoodie, N.; Maclean, K. (1992) Product Chemistry of MCPA-Acid: Density: Lab Project Number: 351663: 8642. Unpublished study prepared by Inveresk Research Intl. 17 p.
- 42450907 Alexander, B.; Dinwoodie, N.; Maclean, K. (1992) Product Chemistry of MCPA-Acid: pH: Lab Project Number: 351679: 8675. Unpublished study prepared by Inveresk Research Intl. 17 p.
- 42577600 AKZO (1992) Submission of product chemistry data in support of the registration of MCPA. Transmittal of 3 studies.
- 42577601 Rausch, L. (1992) Product Chemistry: MCPA. Unpublished study prepared by Akzo Chemicals, Inc. 84 p.
- 42577602 Landvoigt, W. (1992) Product Chemistry Dioxin Analysis for MCPA. Unpublished study prepared by Chemie Linz AG. 145 p.
- 42577603 Rausch, L. (1992) Product Chemistry: MCPA. Unpublished study prepared by AKZO Chemicals, Inc. 173 p.
- 42624401 Jones, E.; Kitching, J.; Anderson, A.; et al. (1992) Ames Salmonella Typhimurium Bacterial Reverse Mutation Assay on MCPA DMAS: Lab Project Number: JEL 24/921053. Unpublished study prepared by Huntingdon Research Centre Ltd. 44 p.
- 42657101 Varcoe, F. (1992) Analysis of Polychlorinated Dibenzo-p-dioxins and and Polychlorinated Dibenzofurans in (4-Chloro-2-methylphenoxy) acetic Acid: Lab Project No. 21916. Unpublished study prepared by Triangle Labs, Inc. 1402 p.
- 42665301 Lai, I. (1993) Hydrolysis of (carbon 14)-MCPA Acid in Buffered Aqueous Solutions: Final Report: Lab Project Number: SC910160. Unpublished study prepared by Battelle Memorial Institute. 67 p.
- 42715001 Baldrick, P.; Crook, D.; Gibson, W.; et al. (1992) Twenty-one Day Dermal Toxicity Study in the Rabbit with MCPA Acid: Lab Project Number: JEL 23/921253. Unpublished study prepared by Huntingdon Research Centre Ltd. 117 p.
- 42723801 Hellwig, J.; Hildebrand, B. (1993) Study of the Prenatal Toxicity of MCPA-Acid in Rats after Oral Administration (Gavage): Lab Project Number: 30R0374/91096. Unpublished study prepared by BASF Aktiengesellschaft. 302 p.

- 42723802 Hellwig, J.; Hildebrand, B. (1993) Study of the Prenatal Toxicity of MCPA-Acid in Rabbits after Oral Administration (Gavage): Lab Project No. 40R0374/91095. Unpublished study prepared by BASF Aktiengesellschaft. 230 p.
- 42757301 Campbell, C.; Dinwoodie, N. (1993) Product Chemistry of MCPA-Acid: Stability: Lab Project Number: 9076. Unpublished study prepared by Inveresk Research International. 56 p.
- 42840403 Jones, E.; Kitching, J.; Anderson, A.; et al. (1993) Ames Salmonella Typhimurium Bacterial Reverse Mutation Assay on MCPA Acid: Lab Project Number: JEL 26/920957. Unpublished study prepared by Huntingdon Research Centre Ltd. 44 p.
- 42853504 Akhurst, L.; King, J.; Anderson, A.; et al. (1993) MCPA Acid Metaphase Chromosome Analysis of Human Lymphocytes Cultured in vitro: Lab Project Number: JEL 32/921190. Unpublished study prepared by Huntingdon Research Centre Ltd. 48 p.
- 42860101 Adams, K.; Ransome, S.; Anderson, A.; et al. (1993) Chinese Hamster Ovary/HGPRT Locus Assay: MCPA DMAS: Final Report: Lab Project Number: JEL 27/921113. Unpublished study prepared by Huntingdon Research Centre Ltd. 42 p.
- 42860103 Adams, K.; Kirkpatrick, D.; Godfrey, A.; et al. (1993) Chinese Hamster Ovary/HGPRT Locus Assay: MCPA Acid: Final Report: Lab Project Number: JEL 29/921115. Unpublished study prepared by Huntingdon Research Centre Ltd. 42 p.
- 42895701 Roberts, N. (1993) Determination of Physico-Chemical Properties of MCPA Technical Acid: Final Report: Lab Study Number 15. Unpublished study prepared by Rhone-Poulenc Chemicals Ltd. 150 p.
- 42928101 Concha, M.; Shepler, K. (1993) Sunlight Photodegradation of (carbon 14)-MCPA in a Buffered Aqueous Solution at pH 5 by Natural Sunlight: Lab Project Number: 410W-1: 410W. Unpublished study prepared by PTRL West, Inc. 88 p.
- 43062806 Douds, D. (1993) A Dermal Sensitization Study in Guinea Pigs with EH 1154 Weed and Feed: A Modified Buehler Design--3 Patch Induction: Final Report: Lab Project Number: 3229.54. Unpublished study prepared by Springborn Labs, Inc. 42 p.
- 43083205 Hoberg, J. (1993) MCPA Acid--Determination of Effects on Seed Germination, Seedling Emergence and Vegetative Vigor of Ten Plant Species: Final Report: Lab Project Number: 10566.0493. 6280.610: 93-8-4888. Unpublished study prepared by Springborn Laboratories, Inc. 246 p.

- 43225801 Concha, M.; Shepler, K. (1994) Photodegradation of (carbon 14)MCPA in/on Soil by Natural Sunlight: Lab Project Number: 436W-1: 436W. Unpublished study prepared by PTRL West, Inc. 91 p.
- 43556801 Hellwig et. al. (1995) MCPA-2-EH-Ester - Subchronic oral toxicity study in beagle dogs - Administration in Diet. Department of Toxicology, BASF, Ludwigshafen/Rhine, FRG, Report No. 31D0385/91115, January 9, 1995. MRID 43556801. Unpublished.
- 43556802 Hellwig, J.; Bachmann, S.; Deckardt, K.; et al. (1995) MCPA-DMA Salt--Subchronic Oral Toxicity Study in Beagle Dogs: Administration in the Diet: Lab Project Number: 31D0385/91115. Unpublished study prepared by BASF Aktiengesellschaft. 407 p.
- 43562601 Mellert, W.; Deckardt, K.; Kaufmann, W.; et al. (1994) MCPA-Acid--Subchronic Oral Dietary Toxicity and Neurotoxicity Study in Wistar Rats: Lab Project Number: 50C0374/91133. Unpublished study prepared by BASF Aktiengesellschaft. 723 p.
- 43562602 Mellert, W.; Kaufmann, W.; Hildebrand, B. (1994) MCPA-Acid--Acute Oral Neurotoxicity Study in Wistar Rats: Lab Project Number: 20C0374/91106. Unpublished study prepared by BASF Aktiengesellschaft. 388 p.
- 43575501 Sabourin, P.; Koebel, D. (1995) Nature of the Residue Study of (carbon 14)-2-Methyl-4-Chlorophenoxyacetic Acid ((carbon 14)-MCPA) using Lactating Goats: Final Report: Lab Project Number: SC930051. Unpublished study prepared by Battelle Columbus Operations. 232 p.
- 43575901 Sabourin, P.; Morgens, J.; Koebel, D. et al. (1995) Nature of the Residue Study of (carbon 14)-2-Methyl-4-Chlorophenoxyacetic Acid ((carbon 14)-MCPA) using Egg-Laying White Leghorn Hens: Final Report: Lab Project Number: SC920100. Unpublished study prepared by Battelle Columbus Operations. 285 p.
- 43755201 MCPA Task Force Three (1995) Overview of Comparative Absorption, Distribution, Metabolism, and Excretion (ADME) of MCPA Acid, DMAS and 2EHE in Rats. Unpublished study. 18 p.
- 43755202 Jahanshahi, M.; Stow, R. (1995) (Carbon 14)-MCPA: Absorption, Distribution, Metabolism, and Excretion in the Rat: Final Report: Lab Project Number: 1149/5-1011: 1149/5. Unpublished study prepared by Corning Hazleton (Europe). 519 p.
- 43915401 Lawrence, L. (1996) Nature of the Residue Study of (carbon 14)-2-Methyl-4-chlorophenoxyacetic Acid (MCPA) Using Lactating Goats: Supplemental Report for MRID #43575501: Lab Project Number: 908: 1827: SC930051. Unpublished

study prepared by PTRL East, Inc. 37 p.

- 43986101 Lawson, P. (1996) Product Identity and Composition MCPA Technical. Unpublished study prepared by Akzo Nobel Chemicals, Inc. 42 p.
- 43986102 Lawson, P. (1994) Product Identity and Composition: MCPA Technical: Lab Project Number: 94L00693. Unpublished study prepared by BASF AG. 101 p.
- 44027301 King, D. (1996) Characterization of ((hydrogen-2)/(carbon-12)/(carbon-14))MCPA: Lab Project Number: 937: 1868. Unpublished study prepared by PTRL East, Inc. 25 p.
- 44192701 MacGregor, J.; Markley, B. (1996) External Validation of a Method for the Determination of 4-Chloro-2-methylphenoxyacetic Acid Dimethylamine Salt (MCPA DMAS) as its Acid Equivalent, 4-Chloro-2-methylphenoxyacetic Acid (MCPA), and 4-Chloro-2-methylphenoxyacetic Acid 2-Ethylhexyl Ester (MCPA 2-EHE) in Water Samples by Gas Chromatography with Mass Selective Detection: Lab Project Number: 364C-102: QMAM94002. Unpublished study prepared by Wildlife International Ltd. 64 p.
- 44239601 Bashir, M. (1997) The Adsorption and Desorption of MCPA, 4-CC and 4-MCA in Soil and Sediment: Lab Project Number: COVANCE 6698-102: CHW 6698-102. Unpublished study prepared by Covance Laboratories Inc. 120 p.
- 44259400 Nufarm bv (1997) Submission of Product Chemistry Data in Support of the MCPA Registration Standard. Transmittal of 1 Study.
- 44259401 Mahlburg, W. (1997) Analytical Methods to Verify Certified Limits for MCPA Acid: Method Validation for the Active Ingredient: Lab Project Number: 97-1A: 61/91-ACC.15: 4416-0001.01. Unpublished study prepared by Twin Cities Testing Corp. 58 p.
- 44337201 King, D. (1997) Characterization of (carbon 14)MCPA, (carbon 14)MCPA 2-EHE, and (carbon 14)MCPA DMAS: (Final Report): Lab Project Number: 1031: 1944. Unpublished study prepared by PTRL East, Inc. 61 p.
- 44337202 King, D. (1997) Characterization of 4-Chloro-2- methylphenoxyacetic Acid Ornithine Conjugate (MCPA-Orn): (Final Report): Lab Project Number: 1041: 1920. Unpublished study prepared by PTRL East, Inc. 29 p.
- 44337203 King, D. (1996) Characterization of MCPA Glycine Conjugate: (Final Report): Lab Project Number: 1023: 1922. Unpublished study prepared by PTRL East, Inc. 28 p.

- 44337204 King, D. (1996) Characterization of (carbon 14)MCPA Metabolites: (Final Report): Lab Project Number: 1032: 1917. Unpublished study prepared by PTRL East, Inc. 74 p.
- 44394401 Petersen-Thiery, M.; Ohnsorge, U.; Liesner, M. et al. (1996) Product Chemistry: Analysis and Certification of Product Ingredients, and Validation of Analytical Methods for MCPA TGAI: Lab Project Number: 96/10117: 94/11238: 95/10013. Unpublished study prepared by BASF Corp. 159 p.
- 44401301 Ohnsorge, U. (1996) Product Identity and Composition, Beginning Materials and Manufacturing Process, and Discussion of the Formation of Impurities of MCPA TGAI: Lab Project Number: 96/10096: 96/10101. Unpublished study prepared by BASF Aktiengesellschaft. 211 p.
- 44463901 Sanson, D. (1997) Physical and Chemical Properties of EH1356 Herbicide. Unpublished study prepared by PBI/Gordon Corp. 15 p. {OPPTS 830.6303, 830.7300, 830.7000, 830.6314, 830.1550, 830.1600, 830.1620, 830.1650, 830.1670, 830.1800}
- 44639901 Moszczynski, W. (1998) Supplement to Product Chemistry Report on MCPA TGAI: Lab Project Number: IPO 98/DN: MCPAOSCT: C/BFR0154. Unpublished study prepared by Institute of Industrial Organic Chemistry. 15 p. {OPPTS 830.1600, 830.1650, 830.1670}
- 44645801 Ohnsorge, U. (1998) Product Identity and Composition, Beginning Materials and Manufacturing Process, and Discussion of the Formation of Impurities of MCPA TGAI: Lab Project Number: 98/10431. Unpublished study prepared by BASF Aktiengesellschaft. 162 p. {OPPTS 830.1550, 830.1600, 830.1650, 830.1670}
- 44645802 Turk, W. (1998) Product Chemistry Certified Limits for MCPA TGAI: Lab Project Number: 98/10284: PCP04660: 98/10339. Unpublished study prepared by BASF Aktiengesellschaft. 60 p. {OPPTS 830.1700}
- 44655702 Barney, W. (1998) Determination of Transferable Turf Residues on Turf Treated with 2,4-D, 2,4-DP, MCPA, MCPP-p and Dicamba: Lab Project Number: BTH TFR TF 001: 98-313: 6926-103. Unpublished study prepared by Grayson Research, LCC. and Covance Laboratories Inc. 521 p. {OPPTS 875.2100}
- 44861801 White, L. (1999) Corrosion Characteristics of EH-1356 Herbicide: Lab Project Number: 99-011. Unpublished study prepared by PBI/Gordon Corporation. 19 p. {OPPTS 830.6320}
- 45001901 King, D. (1999) Characterization of (carbon-14)MCPA: Lab Project Number:

- 1308: 2071. Unpublished study prepared by MCPA Task Force Three. 31 p.
- 45001902 King, D. (1999) Certification of (carbon(6)-13 Ring)HMCPA MME for Use as an Analytical Reference Substance: Lab Project Number: 1362: 2072. Unpublished study prepared by MCPA Task Force Three. 30 p.
- 45001903 King, D. (1999) Certification of (carbon(6)-13 Ring)HMCPA for Use as an Analytical Reference Substance: Lab Project Number: 1362: 2072. Unpublished study prepared by MCPA Task Force Three. 30 p.
- 45001904 King, D. (1999) Characterization of (D)HMCPA MME: Lab Project Number: 1310: 2070. Unpublished study prepared by MCPA Task Force Three. 28 p.
- 45288701 Morrissey, M.; Eberhard, J. (2000) Independent Laboratory Validation of a Method for the Determination of 4-Chloro-2-methylphenoxyacetic Acid 2-Ethylhexyl Ester (MCPA 2-EHE) and 4-Chloro-2-methylphenoxyacetic Acid Dimethylamine Salt (MCPA DMAS) as their 4-Chloro-2-methylphenoxyacetic Acid (MCPA) Equivalent, MCPA, 4-Chloro-2-hydroxymethylphenoxyacetic Acid (HMCPA), 4-Chloro-2-hydroxymethylphenoxyacetic Acid Glucose Conjugate (HMCPA GLU) as its HMCPA Equivalent, and 4-Chloro-2-carboxyphenoxyacetic Acid (CCPA) in Wheat Forage, Straw, and Grain: Final Report: Lab Project Number: 6698-108: 6698-107. Unpublished study prepared by Covance Laboratories Inc. 449 p.
- 45288702 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Winter Wheat: Lab Project Number: GR97-267: 6698-116: 6698-107. Unpublished study prepared by Grayson Research, LLC. 519 p. {OPPTS 860.1500}
- 45288703 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Spring Wheat: Lab Project Number: GR97-269: 6698-107: 6698-118. Unpublished study prepared by Grayson Research, LLC. 445 p. {OPPTS 860.1500}
- 45288704 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Pasture Grass: Lab Project Number: GR97-273: 6698-111: QMAM94002. Unpublished study prepared by Grayson Research, LLC. 361 p. {OPPTS 860.1500}
- 45288705 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Wheat Underseeded with Alfalfa: Lab Project Number: GR97-258: 97258-1: 97258-2. Unpublished study prepared by Grayson Research, LLC. 392 p. {OPPTS 860.1500}

- 45288706 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Rangeland Grass: Lab Project Number: GR97-275: 97275: 97275-1. Unpublished study prepared by Grayson Research, LLC. 317 p. {OPPTS 860.1500}
- 45288707 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues in Processed Fractions of Winter Wheat Following Treatment with MCPA Dimethylamine Salt: Lab Project Number: GR97-271: 97271: 6698-107. Unpublished study prepared by Grayson Research, LLC. 485 p. {OPPTS 860.1520}
- 45288708 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Applications of MCPA 2-Ethylhexyl Ester to Winter Wheat: Lab Project Number: GR97-268: 97268: 6698-117. Unpublished study prepared by Grayson Research, LLC. 511 p. {OPPTS 860.1500}
- 45288709 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA 2-Ethylhexyl Ester to Spring Wheat: Lab Project Number: GR97-270: 6698-119: 6698-107. Unpublished study prepared by Grayson Research, LLC. 464 p. {OPPTS 860.1500}
- 45288710 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA 2-Ethylhexyl Ester to Pasture Grass: Lab Project Number: GR97-274: 97274: 97274-1. Unpublished study prepared by Grayson Research, LLC. 368 p. {OPPTS 860.1500}
- 45288711 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA 2-Ethylhexyl Ester to Rangeland Grass: Lab Project Number: GR97-276: 97276: 97276-1. Unpublished study prepared by Grayson Research, LLC. 334 p. {OPPTS 860.1500}
- 45288712 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA 2-Ethylhexyl Ester to Wheat Underseeded with Alfalfa: Lab Project Number: G97-266: 6698-110: 6698-107. Unpublished study prepared by Grayson Research, LLC. 288 p. {OPPTS 860.1500}
- 45288713 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues in Processed Fractions of Winter Wheat Following Treatment with MCPA 2-Ethylhexyl Ester: Lab Project Number: GR97-272: 97272: 97272-1. Unpublished study prepared by Grayson Research, LLC. 484 p. {OPPTS 860.1520}
- 45549601 Eberhard, J. (2001) Final Report: Freezer Storage Stability Study for MCPA DMAS, 4-Chloro-2-hydroxymethylphenoxyacetic Acid (2-HMCPA) and 4-Chloro-2-carboxyphenoxyacetic Acid (CCPA) and MCPA 2-EHE in Selected

Plant Matrices: Lab Project Number: 6698-122. Unpublished study prepared by Covance Laboratories Inc. 1353 p. {OPPTS 860.1380}

- 45595301 Hardwick, T. (1999) (Carbon-14)-MCPA: Absorption and Excretion in the Beagle Dog: Final Report: Lab Project Number: 729/197: 729/197-D1141. Unpublished study prepared by Covance Laboratories Ltd. 148 p. {OPPTS 870.7485}
- 45595302 Hardwick, T. (2000) (Carbon-14)-MCPA: Metabolite Profiles in the Beagle Dog: Amended Final Report: Lab Project Number: 729/201: 729/201-D1141. Unpublished study prepared by Covance Laboratories Ltd. 78 p.
- 45763101 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues From Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Haywood, Manitoba: Lab Project Number: GR01-394: 01-394.1: 01-394. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and ICMS, Inc. 520 p. {OPPTS 860.1500}
- 45763102 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Elm Creek, Manitoba: Lab Project Number: GR01-413: 01-413.1: 01-413. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Ag-Quest, Inc. 515 p. {OPPTS 860.1500}
- 45763103 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Barnwell, Alberta: Lab Project Number: GR01-414: 01-414.1: 01-414. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Ag-Quest, Inc. 522 p. {OPPTS 860.1500}
- 45763104 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Fairview, Alberta: Lab Project Number: GR01-415: 01-415.1: 02GRY17.REP. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Three Links Ag Research. 502 p. {OPPTS 860.1500}
- 45763105 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Rosthern, Saskatchewan: Lab Project Number: GR01-416: 01-416.1: 02GRY18.REP. Unpublished study prepared by Grayson Research, LLC., Ag Quest, Inc. and Enviro-Test Laboratories, Inc. 583 p. {OPPTS 860.1500}
- 45763106 MCPA Task Force Three (2002) Summary Comparison of 1998 and 2001 Magnitude of Residue Results. Unpublished study. 19 p. {OPPTS 860.1500}

- 45889301 Pigott, G. (2003) MCPA and Testicular Toxicity. Unpublished study prepared by MCPA Task Force Three. 7 p.
- 46276101 Mellert, W.; Deckardt, K.; Kuttler, K.; *et. al. (2004) MCPA and CCPA: Repeated Dose Toxicity Study in Wistar Rats: Administration in the Diet Over 4 Weeks. Project Number: 30C0288/03019, 01Y0288/038009, PCP02751. Unpublished study prepared by BASF Aktiengesellschaft and BASF Ag Research Station (BASF Aktieng). 329 p.
- 46327601 Beimborn, D.; Leibold, E. (2003) (Carbon 14)-MCPA - Study of the Dermal Absorption in Rats. Project Number: 01B0209/026003. Unpublished study prepared by BASF Aktiengesellschaft. 41 p.

PC Code 030502:

MRID

Citation Reference

-
- | | |
|----------|---|
| 4449 | Guardigli, A.; Henckler, P.M. (1973) Final Summary: MCPA and Phenol Metabolite in Pasture and/or Range Grasses. (Unpublished study received on unknown date under 9F0761; prepared by Rhodia, Inc., submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:092001-F) |
| 5004272 | Kirkwood, R.C.; Dalziel, J.; Matlib, A.; Somerville, L. (1972) The role of translocation in selectivity of herbicides with reference to MCPA and MCPB. Pesticide Science 3(3):307-321. |
| 41613003 | Robbins, G. (1990) Guinea Pig Sensitization (Buehler): Lab Project Number: F3045. Unpublished study prepared by Cosmopolitan Safety Evaluation, Inc. 16 p._ |
| 41800901 | Bowman, J.; Gormley, M. (1990) Acute Flow-through Toxicity of Chip- tox (MCPA Sodium Salt) to Bluegill (<i>Lepomis macrochirus</i>): Lab Project Number: 38520. Unpublished study prepared by Analytical Bio-Chemistry Laboratories, Inc. 190 p. |
| 41800902 | Bowman, J.; Gormley, M. (1990) Acute Flow-through Toxicity of Chip- tox (MCPA Sodium Salt) to Rainbow Trout (<i>Oncorhynchus mykiss</i>): Lab Project Number: 38521. Unpublished study prepared by Analytical Bio-Chemistry Laboratories, Inc. 223 p. |
| 41800903 | Burgess, D. (1990) Acute Flow-through Toxicity of Chiptox (MCPA Sodium Salt) to <i>Daphnia magna</i> : Lab Project Number: 38522. Unpublished study prepared by Analytical Bio-Chemistry Laboratories. 187 p. |

- 42133901 Silvoy, J. (1991) MCPA-NA+ Salt Formulation Field Dissipation Terrestrial Study on Small Grains in Washington: Lab Project Number: 6237-118A: 1641-88-43-03-06K-02. Unpublished study prepared by Hazleton Labs America, Inc. in coop. with Northwest Ag. Research Inc. 347 p.

PC Code 030516:

<u>MRID</u>	<u>Citation Reference</u>
4766	Guardigli, A.(1970) MCPA Residues in Flax Seed: Field Test Project No. STP 69-26; 69-27. Includes method no. 104 dated Nov 25, 1969. (Unpublished study received Jan 22, 1971 under 9F0761; prepared by Rhodia, Inc. in cooperation with Univ. of Minnesota and North Dakota State Univ. of Agriculture and Applied Science, submitted by National Agricultural Chemicals Association, Industry Task Force on Phenoxy Herbicide Tolerances, Washington, D.C.; CDL:091308-O)
4993	IR-4 Project at Rutgers, the State University (1974) MCPA--Sorghum Residue Studies. (Unpublished study received Oct 3, 1975 under 6E1681; CDL:097351-A)
5567	Higham, J.W.; Feeny, R.W.; Cheston, K.G.; Snyder, E.H.; Wingfield, C.B. (1975) Avenge(R) (AC 84,777): Determination of CL 84, 777 (1,2-Dimethyl-3,5-diphenyl pyrazolium methyl sulfate), Bromoxynil (3,5-Dibromo-4-hydroxybenzonitrile) and MCPA (2-Methyl- 4-chlorophenoxyacetic acid) Residues in Barley Grain and Straw Following Ground Application (Colorado): Report No. C-594. (Unpublished study received Jan 8, 1975 under 241-EX-64; prepared in cooperation with Lake Ontario Environmental Laboratory, submitted by American Cyanamid Co., Princeton, N.J.; CDL:224170-T)
53734	Akzo Zout Chemie Nederland, B.V. (1975) MCPA: Some Information on Properties, Applications, Stability and Toxicity. Summary of studies 231352-B through 231352-D, 231352-N, 231352-O, 231352-Q through 231352-T, 231355-D, 231355-F through 231355-K, 231355-M through 231355-R, 231355-U, 231355-Y and 231355-Z. (Unpublished study received Aug 15, 1977 under 38117-3; CDL:231355-A)
110363	American Cyanamid Co. (1974) Extent of Avenge Wild Oat Herbicide Residues and MCPA; Bromoxynil Residues in Barley Plants and Grain Resulting from Tank Mix Combinations, Including a Description of the Analytical Methods Used. (Compilation; unpublished study received Jan 8, 1975 under 241-EX-64; CDL:095054-G)

- 40019202 Grimes, J. (1986) MCPA Dimethylamine Salt: An Acute Oral Toxicity Study with the Bobwhite: Final Report: Wildlife International Ltd. Project No. 222-102. Unpublished study prepared by Wildlife International Ltd. 19 p.
- 40062004 Ward, T. (1986) Static Acute Toxicity of Technical MCPA Dimethylamine Salt (2-Methyl-4-chlorophenoxyacetic Acid, Dimethylamine Salt) to the Bluegill, *Lepomis macrochirus*: Laboratory Project ID: D1186. Unpublished study prepared by ERCO/A Division of ENSECO Inc. 19 p.
- 40062006 Ward, T. (1986) Static Acute Toxicity of Technical MCPA Dimethylamine Salt (2-Methyl-4-chlorophenoxyacetic Acid, Dimethylamine Salt) to the Pink Shrimp. *Penaeus Duorarum*: ERCO Laboratory Project D0686. Unpublished study prepared by ERCO/A Division of ENSECO Inc. 19 p.
- 40352101 Jeffrey, M. (1987) MCP Amine Herbicide: Dermal Sensitization Potential in the Hartley Albino Guinea Pig: Laboratory Project ID: DR-0229-0702-003. Unpublished study prepared by Dow Chemical Co. 13 p.
- 40555802 Grimes, J.; Jaber, M. (1988) MCPA Dimethylamine Salt (2-Methyl-4-chlorophenoxyacetic Acid, Dimethylamine Salt): A dietary LC50 Study with the Mallard: Proj. No. 103-285. Unpublished study prepared by Wildlife International Ltd. 26 p.
- 40555803 Grimes, J.; Jaber, M. (1988) MCPA Dimethylamine Salt (2-Methyl-4-chlorophenoxyacetic Acid, Dimethylamine Salt): A Dietary LC50 Study with the Bobwhite: Proj. No. 103-284. Unpublished study prepared by Wildlife International Ltd. 26 p.
- 41800905 Bowman, J.; Gormley, M. (1990) Acute Flow-through Toxicity of Rhomene (MCPA DMA) to Rainbow Trout (*Oncorhynchus mykiss*): Lab Project Number: 38528. Unpublished study prepared by Analytical Bio-Chemistry Laboratories, Inc. 224 p.
- 41800906 Burgess, D. (1990) Acute Flow-Through Toxicity of Rhomene (MCPA DMA) to *Daphnia magna*: Lab Project Number: 38530. Unpublished study prepared by Analytical Bio-Chemistry Laboratories, Inc. 195 p.
- 42113103 Holbert, M. (1991) Acute Inhalation Toxicity Study in Rats: Clean Crop MCP Amine 4: Lab Project Number: 8458-91: 91-47A. Unpublished study prepared by Stillmeadow, Inc. 24 p.
- 42134201 Silvoy, J. (1991) MCPA--Dimethylamine Salt Field Dissipation Terrestrial Study on Pasture Grass in Donalsonville, GA: Lab Project Number: HLA 6237-118B: 1641-

- 88-43-01-18D-01. Unpublished study prepared by Hazleton Labs America, Inc., in coop. with Southern Agric. Research Inc. 346 p.
- 42150301 Hoxter, K.; Lynn, S. (1991) MCPA DMAS: An Acute Contact Toxicity Study with the Honey Bee: Lab Project Number: 222-102. Unpublished study prepared by Wildlife International Ltd. 29 p.
- 42412201 Putt, A. (1992) MCPA DMAS--Acute Toxicity to Daphnids (*Daphnia magna*) under Flow-through Conditions: Final Report: Lab Project Number: 92-4-4235: 10566.0391.6196.115. Unpublished study prepared by Springborn Laboratories, Inc. 60 p.
- 42457101 Chang, J. (1992) Special Study: Dissociation of MCPA DMAS in Water: Final Report: Lab Project Number: SC920051. Unpublished study prepared by Battelle. 40 p.
- 42461301 Hoberg, J. (1992) MCPA-DMAS--Toxicity to the Freshwater Green Alga, *Selenastrum capricornutum*: Final Report: Lab Project Number: 92-6-4285: 10566.1191.6213.430. Unpublished study prepared by Springborn Labs, Inc. 68 p.
- 42596903 Fernando, T. (1992) Sorption/Desorption of (carbon 14)-MCPA Acid on Soils by the Batch Equilibrium Method: Lab Project Number: SC910081. Unpublished study prepared by Bettelle Memorial Institute. 78 p.
- 42624401 Jones, E.; Kitching, J.; Anderson, A.; et al. (1992) Ames Salmonella Typhimurium Bacterial Reverse Mutation Assay on MCPA DMAS: Lab Project Number: JEL 24/921053. Unpublished study prepared by Huntingdon Research Centre Ltd. 44 p.
- 42624402 Munk, R.; Kirsch, P. (1992) Acute Toxicity Study on the Bluegill (*Lepomis macrochirus* RAF.) of MCPA DMAS in a Static System: Lab Project Number: 14F0189/915055. Unpublished study prepared by BASF Aktiengesellschaft. 38 p.
- 42669304 Maggi, V. (1993) Tier II: The Effects of MCPA DMAS on Nontarget Plants: Vegetative Vigor: A Supplement: Lab Project Number: CAR 146-91C: 1147. Unpublished study prepared by California Agricultural Research, Inc. 163 p.
- 42698701 Maggi, V. (1993) The Effects of MCPA DMAS on Nontarget Plants: Seed Germination/Seedling Emergence: Final Report: Lab Project Number: CAR 146-91F: 1145. Unpublished study prepared by California Agricultural Research, Inc. 299 p.
- 42853502 Proudlock, R.; Taylor, K.; Anderson, A.; et al. (1993) MCPA DMAS Micronucleus Test ?in Bone marrow of Mice: Lab Project Number: JEL 33/921197. Unpublished

study prepared by Huntingdon Research Centre Ltd. 43 p.

- 42853505 Akhurst, L.; King, J.; Anderson, A.; et al. (1993) MCPA DMAS Metaphase Chromosome Analysis of Human Lymphocytes Cultured in vitro: Lab Project Number: JEL 30/921176. Unpublished study prepared by Huntingdon Research Centre Ltd. 45 p.
- 42860101 Adams, K.; Ransome, S.; Anderson, A.; et al. (1993) Chinese Hamster Ovary/HGPRT Locus Assay: MCPA DMAS: Final Report: Lab Project Number: JEL 27/921113. Unpublished study prepared by Huntingdon Research Centre Ltd. 42 p.
- 43083206 Hoberg, J. (1993) MCPA-DMA Salt--Toxicity to the Marine Diatom, *Skeletonema costatum*: Lab Project Nos. 10566.0493.6298.450; 93-11-5029. Unpublished study prepared by Springborn Laboratories, Inc. 70 p.
- 43083207 Hoberg, J. (1993) MCPA-DMA Salt--Toxicity to the Freshwater Diatom, *Navicula pelliculosa*: Final Report: Lab Project Number: 10566.0493.6291.440: 93-6-4835. Unpublished study prepared by Springborn Laboratories, Inc. 68 p.
- 43083208 Hoberg, J. (1993) MCPA-DMA Salt--Toxicity to the Freshwater Blue-Green Alga, *Anabaena flos-aquae*: Final Report: Lab Project Number: 10566.0493.6295.420: 93-6-4841. Unpublished study prepared by Springborn Laboratories, Inc. 66 p.
- 43083210 Bettencourt, M. (1993) MCPA-DMA Salt--Acute Toxicity to Sheepshead Minnow (*Cyprinodon variegatus*) under Flow-through Conditions: Final Report: Lab Project Number: 10566.0493.6276. 505: 93-7-4859. Unpublished study prepared by Springborn Laboratories, Inc. 73 p.
- 43126502 Hoberg, J. (1994) MCPA-DMA Salt: Toxicity to Duckweed, *Lemna gibba*: Final Report: Lab Project Number: 93/11/5046: 10566/ 0493/6289/410. Unpublished study prepared by Springborn Lab., Inc. 72 p.
- 43227201 Dyer, I. (1994) MCPA DMA 750 g/I AI--Product Chemistry: Lab Project Number: AHM/EPA/93/ID/05. Unpublished study prepared by A H Marks & Co., Ltd. 37 p.
- 43227202 A. H. Marks & Co., Ltd. (1994) MCPA DMA 750 g/I AI-Beginning Materials Data Sheets and A H Marks' Purchase Specifications: Lab Project Number: AHM/EPA/93/ID/05. Unpublished study. 26 p.
- 43227203 A. H. Marks & Co., Ltd. (1994) A H Marks' Standard Analytical Methods: MCPA DMA 750: Lab Project Number: AHM/EPA/93/ID/05. Unpublished study. 32 p.

- 43227206 Sydney, P. (1993) Formulation of MCPA Dimethylamine Salt Containing 750 g/l: Determination of Physico-chemical Properties: Final Report: Lab Project Number: 93/0995: AMS/044: 93/AMS044/0995. Unpublished study prepared by Pharmaco-LSR Ltd. 68 p.
- 43257901 Maggi, V. (1994) Tier II: The Effects of MCPA DMAS on Nontarget Plants: Seedling Emergence (MRID No. 426987-01): Supplemental Report to the Final Report #CAR 146-91F: Lab Project Number: CAR 195-93. Unpublished study prepared by California Agricultural Research, Inc. and EPL Bio-Analytical Services, Inc. 96 p.
- 43556801 Hellwig et. al. (1995) MCPA-2-EH-Ester - Subchronic oral toxicity study in beagle dogs - Administration in Diet. Department of Toxicology, BASF, Ludwigshafen/Rhine, FRG, Report No. 31D0385/91115, January 9, 1995. MRID 43556801. Unpublished.
- 43556802 Hellwig, J.; Bachmann, S.; Deckardt, K.; et al. (1995) MCPA-DMA Salt--Subchronic Oral Toxicity Study in Beagle Dogs: Administration in the Diet: Lab Project Number: 31D0385/91115. Unpublished study prepared by BASF Aktiengesellschaft. 407 p.
- 43556902 Kirsch, P.; Deckardt, K.; Gembardt, C.; et al. (1995) Study of the Dermal Toxicity of MCPA-DMA Salt in Wistar Rats: Application to the Intact Skin (21 Application): Lab Project Number: 37H0385/91147. Unpublished study prepared by BASF Aktiengesellschaft. 165 p.
- 43562701 Mellert, W.; Deckardt, K.; Kaufmann, W.; et al. (1994) MCPA-DMA Salt--Subchronic Oral Dietary Toxicity and Neurotoxicity Study in Wistar Rats: Lab Project Number: 50C0189/91140. Unpublished study prepared by BASF Aktiengesellschaft. 680 p.
- 43562702 Mellert, W.; Kaufmann, W.; Hildebrand, B. (1994) MCPA-DMA Salt--Acute Oral Neurotoxicity Study in Wistar Rats: Lab Project Number: 20S0189/91112. Unpublished study prepared by BASF Aktiengesellschaft. 405 p.
- 43580301 Sabourin, P. (1995) Nature of the Residue of (carbon 14)-2- Methyl-4-chlorophenoxyacetic Acid ((carbon 14)-MCPA) as the Dimethylamine Salt ((carbon 14)-MCPA DMA) and the 2-Ethylhexyl Ester ((carbon 14)-MCPA 2-EHE) in Wheat: Final Report: Lab Project Number: SC930053. Unpublished study prepared by Battelle. 318 p.
- 43697501 Singer, G. (1995) Terrestrial Field Dissipation of MCPA Dimethylamine Salt Following Ground Application to Wheat and Bareground: Lab Project Number:

- AA940507: 6576-100A: HWI 6576-100A. Unpublished study prepared by American Agricultural Services, Inc. and Hazleton Wisconsin, Inc. 1008 p.
- 43718401 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA Dimethylamine Salt to Winter Wheat: Final Version: Lab Project Number: 93-211RA-1: 94019: 94018. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. 502 p.
- 43756401 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA Dimethylamine Salt to Spring Wheat: Final Report: Lab Project Number: 93-211RA-3: 95-503: 5-TW1. Unpublished study prepared by Quality Management & Analytical Services, Inc. and Hazard Evaluation & Regulatory Affairs Co., Inc. 403 p.
- 43788201 Hoberg, J. (1995) MCPA-DMA Salt--Determination of Effects on Vegetative Vigor of Five Plant Species: Lab Project Number: 13539.1294.6101.610: 95-5-5878. Unpublished study prepared by Springborn Labs, Inc. 142 p.
- 43791901 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA Dimethylamine Salt to Pasture Grass: Lab Project Number: 93-211RA-7: 95-507: 95025. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. and Quality Management & Analytical Services, Inc. 736 p.
- 43793901 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA Dimethylamine Salt to Spring Wheat Underseeded with Alfalfa: Lab Project Number: 95-509: 93-211RA-9: 94027. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. and Quality Management & Analytical Services, Inc. 814 p.
- 43801301 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA Dimethylamine Salt to Rangeland Grass, Ground Application: Lab Project Number: 95-511: 93-211RA-11: QMAS 94029. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. and Quality Management & Analytical Services, Inc. 689 p.
- 43841501 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues in Processed Fractions of Winter Wheat Following Treatment with MCPA Dimethylamine Salt: Lab Project Number: 93-211RA-5: 95-505: 94023. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. and Texas A&M University. 779 p.
- 43883001 Hatfield, M. (1995) Terrestrial Field Dissipation of MCPA Dimethylamine Salt

Following Ground Application to Turfgrass and Bareground: Lab Project Number: AA940509: 12-9406: 6576-100D. Unpublished study prepared by American Agricultural Services, Inc.; Minnesota Valley Testing Lab; and Corning Hazleton Inc. 2381 p.

- 44026801 Fleming, P. (1996) Freezer Storage Stability For MCPA 2-EHE, MCPA, and Major Metabolites in Soil: Lab Project Number: 12-9410: RAM-10-047. Unpublished study prepared by Minnesota Valley Testing Laboratories, Inc. 139 p.
- 44192701 MacGregor, J.; Markley, B. (1996) External Validation of a Method for the Determination of 4-Chloro-2-methylphenoxyacetic Acid Dimethylamine Salt (MCPA DMAS) as its Acid Equivalent, 4-Chloro-2-methylphenoxyacetic Acid (MCPA), and 4-Chloro-2-methylphenoxyacetic Acid 2-Ethylhexyl Ester (MCPA 2-EHE) in Water Samples by Gas Chromatography with Mass Selective Detection: Lab Project Number: 364C-102: QMAM94002. Unpublished study prepared by Wildlife International Ltd. 64 p.
- 44407201 Drottar, K.; Krueger, H. (1997) MCPA DMAS: A Flow-Through Life-Cycle Toxicity Test with the Cladoceran (*Daphnia magna*): Lab Project Number: 364A-101. Unpublished study prepared by Wildlife International Ltd. 92 p. {OPPTS 850.1300}
- 44407202 Drottar, K.; Krueger, H. (1997) MCPA DMAS: An Early Life-Stage Toxicity Test with the Fathead Minnow (*Pimephales promelas*): Lab Project Number: 364A-102. Unpublished study prepared by Wildlife International Ltd. 121 p. {OPPTS 850.1400}
- 44484501 Ohnsorge, U. (1997) Product Chemistry: Product Identity and Composition, Beginning Materials and Manufacturing Process, and Discussion of the Formation of Impurities of MCPA-DMA 750g/L MP: Lab Project Number: 97/11248. Unpublished study prepared by BASF Aktiengesellschaft. 60 p. {OPPTS 830.1550, 830.1600, 830.1650, 830.1670}
- 44484502 Ohnsorge, U. (1997) Product Chemistry: Certified Limits and Analytical Method for MCPA-DMA 750g/L MP: Lab Project Number: 97/11206: CF-A 491: 94/11730. Unpublished study prepared by BASF Aktiengesellschaft. 53 p. {OPPTS 830.1750}
- 44484503 Kaestel, R. (1997) Product Chemistry: Color, Physical State, Odor, Boiling Point, Density, pH, Flammability, Storage Stability, and Viscosity for MCPA-DMA 750g/L MP (BAS 141 24H): Lab Project Number: 97/11068: PCF 01842. Unpublished study prepared by BASF Aktiengesellschaft. 20 p.

- 44484504 Loeffler, U. (1997) Product Chemistry: Flammability for MCPA-DMA 750g/L MP (BAS 141 24H): Lab Project Number: 97/11327: SIK-NR. 97/1859. Unpublished study prepared by BASF Aktiengesellschaft. 8 p.
- 44484505 Kaestel, W. (1994) Product Chemistry: Shelf Life in Original Container (Storage Stability) for MCPA-DMA 550g/L EP (BAS 010 01H): Lab Project Number: 97/10380: PCF01468: PCF 01468. Unpublished study prepared by BASF Aktiengesellschaft. 31 p.
- 44484506 Koenig, W. (1994) Product Chemistry: Storage Stability for MCPA-DMA 550g/L EP (BAS 010 01H): Lab Project Number: 97/10004: PCF 01467. Unpublished study prepared by BASF Aktiengesellschaft. 12 p.
- 44535801 McKerlie, L. (1998) BAS 141 24H: Determination of Oxidizing or Reducing Action: Lab Project Number: 97221: FR9759: 97/5431. Unpublished study prepared by BASF Corp. 14 p. {OPPTS 830.6314}.
- 44535802 Cannan, T. (1998) BAS 141 24H: Determination of Corrosion Characteristics: Lab Project Number: 97210: FR9805: 98/5016. Unpublished study prepared by BASF Corp. 12 p. {OPPTS 830.6320}
- 44639901 Moszczynski, W. (1998) Supplement to Product Chemistry Report on MCPA TGAI: Lab Project Number: IPO 98/DN: MCPAOSCT: C/BFR0154. Unpublished study prepared by Institute of Industrial Organic Chemistry. 15 p.
- 44732401 Bashir, M. (1998) Aerobic Aquatic Metabolism of (carbon-14)-4-Chloro-2-Methylphenoxyacetic Acid Dimethylamine Salt: Lab Project Number: 6698-106. Unpublished study prepared by Covance Laboratories Inc. 134 p. {OPPTS 835.4300}
- 44903501 Drott, K.; Krueger, H. (1999) MCPA DMAS: A 14-Day Toxicity Test With Duckweed (*Lemna gibba* G3): Final Report: Lab Project Number: 364A-103: 364/040798/LEM14DR/SUB364. Unpublished study prepared by Wildlife International Ltd. 72 p.
- 44903502 Palmer, S.; Kendall, T.; Kreuger, H. (1999) MCPA DMAS: A 5-Day Toxicity Test With the Freshwater Alga (*Selenastrum capricornutum*): Lab Project Number: 364A-104: 364/102798/SEL5D2WC/SUB364. Unpublished study prepared by Wildlife International Ltd. 80 p. {OPPTS 850.5400}
- 44903503 Palmer, S.; Kendall, T.; Kreuger, H. (1999) MCPA DMAS: A 5-Day Toxicity Test With the Freshwater Alga (*Anabaena flos-aquae*): Final Report: Lab Project Number: 364A-105B: 364/102798/ANA5D2WC/SUB364. Unpublished study

prepared by Wildlife International Ltd. 81 p. {OPPTS 850.5400}

- 44903504 Palmer, S.; Kendall, T.; Kreuger, H. (1999) MCPA DMAS: A 5-Day Toxicity Test With the Freshwater Diatom (*Navicula pelliculosa*): Final Report: Lab Project Number: 364A-106A: 364/102798/NAV5D2WC/SUB364. Unpublished study prepared by Wildlife International Ltd. 82 p.
- 44903505 Palmer, S.; Kendall, T.; Kreuger, H. (1999) MCPA DMAS: A 5-Day Toxicity Test With the Marine Diatom (*Skeletonema costatum*): Final Report: Lab Project Number: 364A-107: 364/102798/SKE5D2WC/SUB364. Unpublished study prepared by Wildlife International Ltd. 82 p. {OPPTS 850.5400}
- 44954102 Cappon, G. (1999) A Prenatal Developmental Toxicity Study of MCPA-DMA in Rats: Final Report: Lab Project Number: WIL-325003. Unpublished study prepared by WIL Research Laboratories, Inc. 464 p. {OPPTS 870.3700} Relates to L0000410.
- 45033101 Hughes, D.; Bomkamp, D. (2000) Determination of Transferable Turf Residues on Turf Treated with 2,4-D, MCPA DMA, 2,4-D DMA + MCPP-p DMA + Dicamba DMA and MCPA DMA + MCPP-p DMA + 2,4-DP-p DMA: Lab Project Number: BTH TFR TF 003: 6926-105. Unpublished study prepared by Covance Laboratories. 394 p. {OPPTS 875.2100}
- 45288701 Morrissey, M.; Eberhard, J. (2000) Independent Laboratory Validation of a Method for the Determination of 4-Chloro-2-methylphenoxyacetic Acid 2-Ethylhexyl Ester (MCPA 2-EHE) and 4-Chloro-2-methylphenoxyacetic Acid Dimethylamine Salt (MCPA DMAS) as their 4-Chloro-2-methylphenoxyacetic Acid (MCPA) Equivalent, MCPA, 4-Chloro-2-hydroxymethylphenoxyacetic Acid (HMCPA), 4-Chloro-2-hydroxymethylphenoxyacetic Acid Glucose Conjugate (HMCPA GLU) as its HMCPA Equivalent, and 4-Chloro-2-carboxyphenoxyacetic Acid (CCPA) in Wheat Forage, Straw, and Grain: Final Report: Lab Project Number: 6698-108: 6698-107. Unpublished study prepared by Covance Laboratories Inc. 449 p.
- 45288702 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Winter Wheat: Lab Project Number: GR97-267: 6698-116: 6698-107. Unpublished study prepared by Grayson Research, LLC. 519 p. {OPPTS 860.1500}
- 45288703 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Spring Wheat: Lab Project Number: GR97-269: 6698-107: 6698-118. Unpublished study prepared by Grayson Research, LLC. 445 p. {OPPTS 860.1500}

- 45288704 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Pasture Grass: Lab Project Number: GR97-273: 6698-111: QMAM94002. Unpublished study prepared by Grayson Research, LLC. 361 p. {OPPTS 860.1500}
- 45288705 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Wheat Underseeded with Alfalfa: Lab Project Number: GR97-258: 97258-1: 97258-2. Unpublished study prepared by Grayson Research, LLC. 392 p. {OPPPTS 860.1500}
- 45288706 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt to Rangeland Grass: Lab Project Number: GR97-275: 97275: 97275-1. Unpublished study prepared by Grayson Research, LLC. 317 p. {OPPTS 860.1500}
- 45312201 Mayer, P.; Oldersma, H.; Hanstveit, A. (2000) Determination of the Effect of MCPA DMAS on the Growth of the Fresh Water Green Alga *Selenastrum capricornutum*: Lab Project Number: 00-2317/01: V2317/01. Unpublished study prepared by TNO Nutrition and Food Research. 39 p. {OPPTS 850.5400}_
- 45480901 Brown, A. (2001) MCPA-DMA 750g/L: One Year Shelf-Life Storage Stability and Corrosion Characteristics in Commercial Type Containers: Final Report: Lab Project Number: MI-0011. Unpublished study prepared by Micro Flo Company. 8 p. {OPPTS 830.6317 and 830.6320}
- 45503801 Mayer, P.; Oldersma, H.; Hanstveit, A. (2001) Determination of the Effect of MCPA DMAS on the Growth of the Fresh Water Green Alga *Selenastrum capricornutum*: Addendum: Lab Project Number: ALGENTOX/180400: 00-2317/01: TNO RPT V2317/01. Unpublished study prepared by Nufarm (UK) Ltd. 43 p.
- 45549601 Eberhard, J. (2001) Final Report: Freezer Storage Stability Study for MCPA DMAS, 4-Chloro-2-hydroxymethylphenoxyacetic Acid (2-HMCPA) and 4-Chloro-2-carboxyphenoxyacetic Acid (CCPA) and MCPA 2-EHE in Selected Plant Matrices: Lab Project Number: 6698-122. Unpublished study prepared by Covance Laboratories Inc. 1353 p. {OPPTS 860.1380}
- 45554403 Kranzfelder, J. (2000) Toxicity of MCPA DMAS to the Unicellular Green Alga, *Selenastrum capricornutum*, Determined Under Static Test Conditions: Lab Project Number: 45963. Unpublished study prepared by ABC Laboratories, Inc. 61 p.
- 45763101 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues From Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to

Spring Wheat in Haywood, Manitoba: Lab Project Number: GR01-394: 01-394.1: 01-394. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and ICMS, Inc. 520 p. {OPPTS 860.1500}

- 45763102 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Elm Creek, Manitoba: Lab Project Number: GR01-413: 01-413.1: 01-413. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Ag-Quest, Inc. 515 p. {OPPTS 860.1500}
- 45763103 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Barnwell, Alberta: Lab Project Number: GR01-414: 01-414.1: 01-414. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Ag-Quest, Inc. 522 p. {OPPTS 860.1500}
- 45763104 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Fairview, Alberta: Lab Project Number: GR01-415: 01-415.1: 02GRY17.REP. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Three Links Ag Research. 502 p. {OPPTS 860.1500}
- 45763105 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Rosthern, Saskatchewan: Lab Project Number: GR01-416: 01-416.1: 02GRY18.REP. Unpublished study prepared by Grayson Research, LLC., Ag Quest, Inc. and Enviro-Test Laboratories, Inc. 583 p. {OPPTS 860.1500}

PC Code 030564:

<u>MRID</u>	<u>Citation Reference</u>
156458	Ullmann, L. (1985) Acute Oral Toxicity (LD50) Study with CL 8808/7 CE in Rats: Report: Project 041927. Unpublished study prepared by Research & Consulting Co. AG. 42 p.
156459	Ullmann, L. (1985) Acute Dermal Toxicity (LD50) Study with CL 8808/7 CE in Rats: Report: Project 042006. Unpublished study prepared by Research & Consulting Co. AG. 23 p.
156460	Ullmann, L. (1985) 4-Hour Acute Aerosol Inhalation Toxicity (LC50) Study with

- CL 8808/7 CE in Rats: Report: Project 042017. Unpublished study prepared by Research & Consulting Co. AG. 35 p.
- 156522 Ullmann, L. (1985) Primary Eye Irritation Study with CL 8808/7 CE i Rabbits: Report: Project 053583. Unpublished study prepared by Research & Consulting Co. AG. 30 p.
- 42853506 Akhurst, L.; King, J.; Anderson, A.; et al. (1993) MCPA 2-EHE Metaphase Chromosome Analysis of Human Lymphocytes Cultured in vitro: Lab Project Number: JEL 31/921188. Unpublished study prepared by Huntingdon Research Centre Ltd. 45 p.
- 42860102 Adams, K.; Henly, S.; Anderson, A.; et al. (1993) Chinese Hamster Ovary/HGPRT Locus Assay: MCPA 2-EHE: Final Report: Lab Project Number: JEL 28/921114. Unpublished study prepared by Huntingdon Research Centre Ltd. 42 p.
- 42870001 Jones, E.; Kitching, J.; Anderson, A.; et al. (1993) Ames Salmonella typhimurium Bacterial Reverse Mutation Assay on MCPA 2-EHE: Final Report: Lab Project Number: JEL 25/921054. Unpublished study prepared by Huntingdon Research Centre Ltd. 44 p.
- 43083211 Hoberg, J. (1993) MCPA-2EH Ester Technical-Toxicity to the Freshwater Diatom, *Navicula pelliculosa*: Final Report: Lab Project Number: 10566.0493.6293.440: 93-10-4993. Unpublished study prepared by Springborn Laboratories, Inc. 68 p.
- 43083212 Hoberg, J. (1993) MCPA-2EH Ester Technical--Toxicity to the Marine Diatom, *Skeletonema costatum*: Final Report: Lab Project Number: 10566.0493.6299.450: 93-10-4982. Unpublished study prepared by Springborn Laboratories, Inc. 69 p.
- 43083213 Hoberg, J. (1993) MCPA-2EH Ester Technical--Toxicity to the Freshwater Blue-Green Alga, *Anabaena flos-aquae*: Final Report: Lab Project Number: 10566.0493.6296.420: 93-9-4939. Unpublished study prepared by Springborn Laboratories, Inc. 64 p.
- 43083214 Hoberg, J. (1993) MCPA-2EH Ester Technical-Toxicity to Duckweed, *Lemna gibba*: Final Report: Lab Project Number: 10566.0493.6290. 410: 93-10-4976. Unpublished study prepared by Springborn Laboratories, Inc. 70 p.
- 43086501 Bettencourt, M. (1993) MCPA-2EH Ester Technical-Acute Toxicity to Sheepshead Minnow (*Cyprinodon variegatus*) under Flow-through Conditions: Final Report: Lab Project Number: 93/9/4928. Unpublished study prepared by Springborn Laboratories, Inc. 66 p.
- 43129310 Dinwoodie, N. (1993) MCPA 2EH Ester Determination of Physical Chemical

Properties: Lab Project Number: IRI 351815: 9618. Unpublished study prepared by Inveresk Research Laboratories. 56 p.

- 43556701 Mellert, W.; Deckardt, K.; Kaufmann, W.; et al. (1994) MCPA-2-EH Ester-- Subchronic Oral Dietary Toxicity and Neurotoxicity Study in Wistar Rats: Lab Project Number: 50C0385/91141. Unpublished study prepared by BASF Aktiengesellschaft. 686 p.
- 43556702 Mellert, W.; Kaufmann, W.; Hildenbrand, B.; et al. (1994) MCPA-2-EH Ester-- Acute Oral Neurotoxicity Study in Wistar Rats: Lab Project Number: 20S0385/91113. Unpublished study prepared by BASF Aktiengesellschaft. 391 p.
- 43556801 Hellwig, J.; Bachmann, S.; Deckardt, K.; et al. (1995) MCPA-2-EH-Ester-- Subchronic Oral Toxicity Study in Beagle Dogs: Administration in the Diet: Lab Project Number: 31D0385/91115. Unpublished study prepared by BASF Aktiengesellschaft. 398 p.
- 43580301 Sabourin, P. (1995) Nature of the Residue of (carbon 14)-2- Methyl-4- chlorophenoxyacetic Acid ((carbon 14)-MCPA) as the Dimethylamine Salt ((carbon 14)-MCPA DMA) and the 2-Ethylhexyl Ester ((carbon 14)-MCPA 2-EHE) in Wheat: Final Report: Lab Project Number: SC930053. Unpublished study prepared by Battelle. 318 p.
- 43724301 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA 2-Ethylhexyl Ester to Winter Wheat: (Final Report): Lab Project Number: 95-502: 93-211RA-2: QMAS 94020. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. 507 p.
- 43724401 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA 2-Ethylhexyl Ester to Spring Wheat: Final Version: Lab Project Number: 95-504: 93-211RA-4: QMAS 94022. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. and Quality Management & Analytical Services, Inc. 402 p.
- 43764101 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues in Processed Fractions of Winter Wheat Following Treatment with MCPA 2-Ethylhexyl Ester: Lab Project Number: 93-211RA-6: 95-506: 94024. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc.; Quality Management & Analytical Services, Inc.; and Texas A&M Univ. 683 p.
- 43782401 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA 2-Ethylhexyl Ester to Pasture Grass: Lab Project Numbers: 95-508: 93-211RA-8: 94026. Unpublished study prepared by Hazard Evaluation &

Regulatory Affairs Co., Inc. 722 p.

- 43804601 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA 2-Ethylhexyl Ester to Spring Wheat Underseeded with Alfalfa: Lab Project Number: 95-510: 93-211RA-10: 94028. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. and Quality Management & Analytical Services, Inc. 814 p.
- 43826401 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA 2-Ethylhexyl Ester to Rangeland Grass, Ground Application: Lab Project Number: 93-211RA-12: 95-512: QMAS 94030. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. and Quality Management & Analytical Services, Inc. 680 p.
- 43826402 Honeycutt, R.; DeGeare, M. (1995) Magnitude of MCPA Residues from Application of MCPA 2-Ethylhexyl Ester to Rangeland Grass, Aerial Application: Lab Project Number: 93-211RA-13: 95-513: QMAS 94031. Unpublished study prepared by Hazard Evaluation & Regulatory Affairs Co., Inc. and Quality Management & Analytical Services, Inc. 413 p.
- 44192701 MacGregor, J.; Markley, B. (1996) External Validation of a Method for the Determination of 4-Chloro-2-methylphenoxyacetic Acid Dimethylamine Salt (MCPA DMAS) as its Acid Equivalent, 4-Chloro-2-methylphenoxyacetic Acid (MCPA), and 4-Chloro-2-methylphenoxyacetic Acid 2-Ethylhexyl Ester (MCPA 2-EHE) in Water Samples by Gas Chromatography with Mass Selective Detection: Lab Project Number: 364C-102: QMAM94002. Unpublished study prepared by Wildlife International Ltd. 64 p.
- 44655702 Barney, W. (1998) Determination of Transferable Turf Residues on Turf Treated with 2,4-D, 2,4-DP, MCPA, MCPP-p and Dicamba: Lab Project Number: BTH TFR TF 001: 98-313: 6926-103. Unpublished study prepared by Grayson Research, LCC. and Covance Laboratories Inc. 521 p. {OPPTS 875.2100}
- 44914027 Cookinham, J. (1999) Bronate Herbicide Product Chemistry: Lab Project Number: 5605-F. Unpublished study prepared by Midwest Research Institute. 126 p. {OPPTS 830.1550, 830.1620, 830.1670, 830.1750}
- 44929001 Sawyer, R. (1999) Product Chemistry: Riverdale MCPA Technical IOE: Lab Project Number: IOE-MCPA TECHNICAL. Unpublished study prepared by Riverdale Chemical Co. 4 p.
- 44954101 Cappon, G. (1999) A Prenatal Developmental Toxicity Study of MCPA-2-EHE in Rats: Final Report: Lab Project Number: WIL-325004. Unpublished study prepared

by WIL Research Laboratories, Inc. 447 p. {OPPTS 870.3700} Relates to L0000410.

- 45173401 Sawyer, R. (1999) Product Chemistry: Riverdale MCPA Technical IOE. Unpublished study prepared by Riverdale Chemical Company. 8 p.
- 45288701 Morrissey, M.; Eberhard, J. (2000) Independent Laboratory Validation of a Method for the Determination of 4-Chloro-2-methylphenoxyacetic Acid 2-Ethylhexyl Ester (MCPA 2-EHE) and 4-Chloro-2-methylphenoxyacetic Acid Dimethylamine Salt (MCPA DMAS) as their 4-Chloro-2-methylphenoxyacetic Acid (MCPA) Equivalent, MCPA, 4-Chloro-2-hydroxymethylphenoxyacetic Acid (HMCPA), 4-Chloro-2-hydroxymethylphenoxyacetic Acid Glucose Conjugate (HMCPA GLU) as its HMCPA Equivalent, and 4-Chloro-2-carboxyphenoxyacetic Acid (CCPA) in Wheat Forage, Straw, and Grain: Final Report: Lab Project Number: 6698-108: 6698-107. Unpublished study prepared by Covance Laboratories Inc. 449 p.
- 45288708 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Applications of MCPA 2-Ethylhexyl Ester to Winter Wheat: Lab Project Number: GR97-268: 97268: 6698-117. Unpublished study prepared by Grayson Research, LLC. 511 p. {OPPTS 860.1500}
- 45288709 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA 2-Ethylhexyl Ester to Spring Wheat: Lab Project Number: GR97-270: 6698-119: 6698-107. Unpublished study prepared by Grayson Research, LLC. 464 p. {OPPTS 860.1500}
- 45288710 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA 2-Ethylhexyl Ester to Pasture Grass: Lab Project Number: GR97-274: 97274: 97274-1. Unpublished study prepared by Grayson Research, LLC. 368 p. {OPPTS 860.1500}
- 45288711 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA 2-Ethylhexyl Ester to Rangeland Grass: Lab Project Number: GR97-276: 97276: 97276-1. Unpublished study prepared by Grayson Research, LLC. 334 p. {OPPTS 860.1500}
- 45288712 Kludas, R. (2000) Magnitude of MCPA and Metabolite Residues from Application of MCPA 2-Ethylhexyl Ester to Wheat Underseeded with Alfalfa: Lab Project Number: G97-266: 6698-110: 6698-107. Unpublished study prepared by Grayson Research, LLC. 288 p. {OPPTS 860.1500}
- 45763101 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues From Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to

- Spring Wheat in Haywood, Manitoba: Lab Project Number: GR01-394: 01-394.1: 01-394. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and ICMS, Inc. 520 p. {OPPTS 860.1500}
- 45763102 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Elm Creek, Manitoba: Lab Project Number: GR01-413: 01-413.1: 01-413. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Ag-Quest, Inc. 515 p. {OPPTS 860.1500}
- 45763103 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Barnwell, Alberta: Lab Project Number: GR01-414: 01-414.1: 01-414. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Ag-Quest, Inc. 522 p. {OPPTS 860.1500}
- 45763104 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Fairview, Alberta: Lab Project Number: GR01-415: 01-415.1: 02GRY17.REP. Unpublished study prepared by Grayson Research, LLC., Enviro-Test Laboratories, Inc. and Three Links Ag Research. 502 p. {OPPTS 860.1500}
- 45763105 Barney, W. (2002) Magnitude of MCPA and Metabolite Residues from Application of MCPA Dimethylamine Salt, MCPA 2-Ethylhexyl Ester and MCPA Acid to Spring Wheat in Rosthern, Saskatchewan: Lab Project Number: GR01-416: 01-416.1: 02GRY18.REP. Unpublished study prepared by Grayson Research, LLC., Ag Quest, Inc. and Enviro-Test Laboratories, Inc. 583 p. {OPPTS 860.1500}
- 45804401 Hale, M. (2002) MCPA 2EH Technical: Product Chemistry: Product Identity and Composition: Lab Project Number: USA/MCPA 2EH/MCPA 2EHVOL1. Unpublished study prepared by A.H. Marks and Company Ltd. 11 p. {OPPTS 830.1550}
- 45804402 Hale, M. (2002) MCPA 2EH Technical: Product Chemistry: Description of Materials Used to Produce the Product: Lab Project Number: USA/MCPA 2EH/MCPA 2EHVOL2. Unpublished study prepared by A.H. Marks and Company Ltd. 58 p. {OPPTS 830.1600}
- 45804403 Hale, M. (2002) MCPA 2EH Technical: Product Chemistry: Description of Production Process: Lab Project Number: USA/MCPA 2EH/MCPA 2EHVOL3: 553: 552. Unpublished study prepared by A.H. Marks and Company Ltd. 60 p. {OPPTS 830.1620}

- 45804404 Hale, M. (2002) MCPA 2EH Technical: Product Chemistry: Discussion of Formation of Impurities: Lab Project Number: USA/MCPA 2EH/MCPA 2EH VOL4. Unpublished study prepared by A.H. Marks and Company Ltd. 12 p. {OPPTS 830.1670}
- 45804405 Hale, M. (2002) MCPA 2EH Technical: Product Chemistry: 5 Batch Analysis Study Report: Lab Project Number: USA/MCPA 2EH/MCPA 2EH VOL5: 00/0124. Unpublished study prepared by A.H. Marks and Company Ltd. 123 p.
- 45804406 Hale, M. (2002) MCPA 2EH Technical: Product Chemistry: Preliminary Analysis, Certified Limits, Enforcement Analytical Method: Lab Project Number: USA/MCPA 2EH/MCPA 2EHVOL6: AHM 00/MCPA 2EH: 322. Unpublished study prepared by A.H. Marks and Company Ltd. 48 p. {OPPTS 830.1700, 830.1750, 830.1800}

Appendix E. Generic Data Call-In

A Data Call-In (DCI), with all pertinent instructions, was sent to registrants in March 2006 under separate cover.

Appendix F. Product-Specific Data Call-In

A Data Call-In (DCI), with all pertinent instructions, was sent to registrants in March 2006 under separate cover.

Appendix G. EPA'S Batching of MCPA Products for Meeting Acute Toxicity Data Requirements for Reregistration

In an effort to reduce the time, resources and number of animals needed to fulfill the acute toxicity data requirements for reregistration of products containing MCPA as the active ingredient, the Agency has batched products which can be considered similar for purposes of acute toxicity. Factors considered in the sorting process include each product's active and inert ingredients (identity, percent composition and biological activity), type of formulation (e.g., emulsifiable concentrate, aerosol, wettable powder, granular, etc.), and labeling (e.g., signal word, use classification, precautionary labeling, etc.). Note that the Agency is not describing batched products as "substantially similar" since some products within a batch may not be considered chemically similar or have identical use patterns.

Using available information, batching has been accomplished by the process described in the preceding paragraph. Notwithstanding the batching process, the Agency reserves the right to require, at any time, acute toxicity data for an individual product should the need arise.

Registrants of products within a batch may choose to cooperatively generate, submit or cite a single battery of six acute toxicological studies to represent all the products within that batch. It is the registrants' option to participate in the process with all other registrants, only some of the other registrants, or only their own products within a batch, or to generate all the required acute toxicological studies for each of their own products. If a registrant chooses to generate the data for a batch, he/she must use one of the products within the batch as the test material. If a registrant chooses to rely upon previously submitted acute toxicity data, he/she may do so provided that the data base is complete and valid by today's standards (see acceptance criteria attached), the formulation tested is considered by EPA to be similar for acute toxicity, and the formulation has not been significantly altered since submission and acceptance of the acute toxicity data. Regardless of whether new data is generated or existing data is referenced, registrants must clearly identify the test material by EPA Registration Number. If more than one confidential statement of formula (CSF) exists for a product, the registrant must indicate the formulation actually tested by identifying the corresponding CSF.

In deciding how to meet the product specific data requirements, registrants must follow the directions given in the Data Call-In Notice and its attachments appended to the RED. The DCI Notice contains two response forms which are to be completed and submitted to the Agency within 90 days of receipt. The first form, "Data Call-In Response," asks whether the registrant will meet the data requirements for each product. The second form, "Requirements Status and Registrant's Response," lists the product specific data required for each product, including the standard six acute toxicity tests. A registrant who wishes to participate in a batch must decide whether he/she will provide the data or depend on someone else to do so. If a registrant supplies the data to support a batch of products, he/she

must select one of the following options: Developing Data (Option 1), Submitting an Existing Study (Option 4), Upgrading an Existing Study (Option 5) or Citing an Existing Study (Option 6). If a registrant depends on another's data, he/she must choose among: Cost Sharing (Option 2), Offers to Cost Share (Option 3) or Citing an Existing Study (Option 6). If a registrant does not want to participate in a batch, the choices are Options 1, 4, 5 or 6. However, a registrant should know that choosing not to participate in a batch does not preclude other registrants in the batch from citing his/her studies and offering to cost share (Option 3) those studies.

One hundred seventy three products were found which contain **MCPA** as the active ingredient. These products have been placed into 4 sections: **MCPA Acids** (PC Code 030501 - contains 34 products placed in 6 batches and a No Batch group); **MCPA Sodium Salts** (PC Code 030502 - contains 5 products placed in 1 batch and a No Batch group); **MCPA Amine Salts** (PC Code 030516 - contains 90 products placed in 16 batches and a No Batch group); **MCPA 2-ethylhexyl ester** (PC Code 030564 - contains 44 products placed in 5 batches and a No Batch group). All were placed in these batches in accordance with the active and inert ingredients and type of formulation. Two esters from acid and sodium salt groups (EPA Reg. Nos. 2217-873 & 62719-8) have been batched with other esters. Furthermore, the following bridging strategies are deemed acceptable for this chemical:

MCPA Acids:

- Batch 2 - EPA Reg. No. 2217-722 may not cite data from EPA Reg. No. 2217-821.
- Batch 3 - EPA Reg. No. 2217-750 may not cite data from EPA Reg. No. 2217-784.
- Batch 6 - EPA Reg. Nos. 228-300 & 2217-822 may not cite data from EPA Reg. Nos. 228-301, 2217-798, & 2217-799.

MCPA Amine Salts:

- Batch 1 - EPA Reg. Nos. 11685-23 & 15440-27 may not cite data from EPA Reg. No. 228-290.
- Batch 8 - EPA Reg. No. 228-349 may not cite data from EPA Reg. No. 228-350.
- Batch 9 - EPA Reg. No. 228-269 may not cite data from EPA Reg. Nos. 228-270 or 228-330.
- Batch 10 - EPA Reg. No. 228-324 may not cite data from EPA Reg. No. 228-326.
- Batch 12 - EPA Reg. Nos. 228-219 & 228-225 may not cite data from EPA Reg. No. 228-226.
- Batch 13 - EPA Reg. No. 228-229 may not cite data from EPA Reg. No. 228-224.
- Batch 14 - EPA Reg. No. 228-272 may not cite data from 2217-792.
- Batch 15 - EPA Reg. Nos. 228-286, 228-229, & 228-327 may not cite data from 228-304.

All sections: No Batch: All products in each of the No Batch groups should generate their own data.

NOTE: The technical acute toxicity values included in this document are for informational purposes only. The data supporting these values may or may not meet the current acceptance criteria.

MCPA ACIDS (PC Code 030501)

<u>Batch 1</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>11685-13</u>	<u>94.0</u>
	<u>11685-14</u>	<u>94.0</u>
	<u>11685-22</u>	<u>96.0</u>
	<u>15440-7</u>	<u>95.0</u>
	<u>15440-21</u>	<u>94.0</u>
	<u>35935-8</u>	<u>95.0</u>
	<u>35935-9</u>	<u>95.0</u>
	<u>62719-60</u>	<u>96.6</u>
	<u>67591-2</u>	<u>95.0</u>
	<u>70596-1</u>	<u>96.6</u>

<u>Batch 2</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>2217-722</u>	<u>MCPA: 45.59</u> <u>MCPP: 10.20</u> <u>Dicamba: 4.30</u>

<u>Batch 2</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>2217-821</u>	<u>MCPA: 45.00</u> <u>MCPP: 9.00</u> <u>Dicamba: 4.50</u>

<u>Batch 3</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>2217-750</u>	<u>MCPA acid: 32.43</u> <u>MCPP: 7.26</u> <u>Dicamba: 3.06</u>
	<u>2217-784</u>	<u>MCPA acid: 32.43</u> <u>MCPP: 6.48</u> <u>Dicamba: 3.24</u>

<u>Batch 4</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>5905-510</u>	<u>23.7</u>
	<u>11685-20</u>	<u>24.0</u>
	<u>62719-58</u>	<u>23.7</u>

<u>Batch 5</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>538-160</u>	<u>MCPA: 1.37</u> <u>MCPP: 1.37</u>
	<u>538-218</u>	<u>MCPA: 1.37</u> <u>MCPP: 1.37</u>

<u>Batch 5</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>538-222</u>	<u>MCPA: 1.37</u> <u>MCPP: 1.37</u>
	<u>9198-198</u>	<u>MCPA: 1.37</u> <u>MCPP: 1.37</u>

<u>Batch 6</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-300</u>	<u>MCPA: 0.820</u> <u>MCPP: 0.165</u> <u>Dicamba: 0.080</u>
	<u>228-301</u>	<u>MCPA: 0.630</u> <u>MCPP: 0.125</u> <u>Dicamba: 0.060</u>
	<u>2217-798</u>	<u>MCPA: 0.690</u> <u>MCPP: 0.150</u> <u>Dicamba: 0.060</u>
	<u>2217-799</u>	<u>MCPA: 0.560</u> <u>MCPP: 0.120</u> <u>Dicamba: 0.050</u>
	<u>2217-822</u>	<u>MCPA: 0.820</u> <u>MCPP: 0.330</u> <u>Dicamba: 0.08</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-199</u>	<u>22.25</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-228</u>	<u>MCPA: 17.0</u> <u>MCPP: 8.5</u> <u>Dichlorprop: 8.5</u>
	<u>228-285</u>	<u>MCPA: 50.0</u> <u>MCPP: 20.0</u> <u>Dicamba: 5.0</u>
	<u>228-306</u>	<u>MCPA: 0.82</u> <u>MCPP: 0.33</u> <u>Dicamba: 0.08</u>
	<u>2217-873</u>	<u>MCPA: 43.09</u> <u>MCPP: 5.64</u> <u>Carfentrazone-ethyl: 0.50</u>
	<u>10404-70</u>	<u>MCPA: 31.50</u> <u>MCPP: 12.70</u> <u>Dicamba: 3.30</u>
	<u>42750-24</u>	<u>22.25</u>
	<u>62719-8</u>	<u>23.70</u>

MCPA SODIUM SALTS (PC Code 030502)

<u>Batch 1</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-199</u>	<u>22.25</u>
	<u>5905-510</u>	<u>23.70</u>
	<u>62719-58</u>	<u>23.70</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>11685-20</u>	<u>24.00</u>
	<u>42750-24</u>	<u>22.25</u>

MCPA AMINE SALTS (PC Code 030516)

<u>Batch 1</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-290</u>	<u>75.0</u>
	<u>11685-23</u>	<u>77.9</u>
	<u>15440-27</u>	<u>77.8</u>

<u>Batch 2</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
-	<u>34704-130</u>	<u>52.0</u>
	<u>67591-01</u>	<u>52.0</u>

<u>Batch 3</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
-	<u>11685-19</u>	<u>52.1</u>
	<u>71368-55</u>	<u>52.1</u>

<u>Batch 4</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
-	<u>2217-362</u>	<u>50.37</u>

<u>Batch 4</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>5905-502</u>	<u>52.2</u>
	<u>15440-37</u>	<u>52.1</u>
	<u>62719-13</u>	<u>52.1</u>

<u>Batch 5</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
-	<u>228-143</u>	<u>48.58</u>
	<u>1381-104</u>	<u>48.72</u>

<u>Batch 6</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-271</u>	<u>MCPA: 10.10</u> <u>MCPP: 2.00</u> <u>Dicamba: 0.99</u>
	<u>228-310</u>	<u>MCPA: 10.10</u> <u>MCPP: 2.00</u> <u>Dicamba: 0.99</u>

<u>Batch 7</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
-	<u>228-334</u>	<u>MCPA: 13.72</u> <u>Triclopyr: 1.56</u> <u>Dicamba: 1.35</u>

<u>Batch 7</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-424</u>	<u>MCPA: 13.72</u> <u>Triclopyr:1.56</u> <u>Dicamba: 1.35</u>

<u>Batch 8</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
—	<u>228-349</u>	<u>MCPA: 13.47</u> <u>Clopyralid:1.45</u> <u>Dicamba: 1.32</u>
	<u>228-350</u>	<u>MCPA: 10.78</u> <u>Clopyralid:1.16</u> <u>Dicamba: 1.06</u>

<u>Batch 9</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
—	<u>228-269</u>	<u>MCPA: 1.01</u> <u>MCP: 0.40</u> <u>Dicamba: 0.09</u>
	<u>228-270</u>	<u>MCPA: 0.808</u> <u>MCP: 0.157</u> <u>Dicamba: 0.079</u>
	<u>228-330</u>	<u>MCPA: 0.808</u> <u>MCP: 0.157</u> <u>Dicamba: 0.060</u>

<u>Batch 10</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
–	<u>228-324</u>	<u>MCPA: 1.625</u> <u>Triclopyr: 0.184</u> <u>Dicamba: 0.159</u>
	<u>228-325</u>	<u>MCPA: 1.100</u> <u>Triclopyr: 0.120</u> <u>Dicamba: 0.110</u>
	<u>228-326</u>	<u>MCPA: 0.820</u> <u>Triclopyr: 0.093</u> <u>Dicamba: 0.080</u>

<u>Batch 11</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
–	<u>2217-730</u>	<u>MCPA: 2.093</u> <u>MCP:1.858</u> <u>Dicamba: 0.412</u>
	<u>2217-737</u>	<u>MCPA: 2.818</u> <u>MCP:0.672</u> <u>Dicamba: 0.313</u>

<u>Batch 12</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
–	<u>228-219</u>	<u>MCPA: 0.416</u> <u>MCP: 0.206</u> <u>2,4-DP: 0.203</u>

<u>Batch 12</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-225</u>	<u>MCPA: 0.318</u> <u>MCPP: 0.314</u> <u>2,4-DP: 0.310</u>
	<u>228-226</u>	<u>MCPA: 0.159</u> <u>MCPP: 0.157</u> <u>2,4-DP: 0.155</u>

<u>Batch 13</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
-	<u>228-224</u>	<u>MCPA: 0.331</u> <u>MCPP:0.163</u> <u>2,4-DP: 0.161</u>
	<u>228-229</u>	<u>MCPA: 0.416</u> <u>MCPP:0.411</u> <u>2,4-DP: 0.405</u>

<u>Batch 14</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
-	<u>228-272</u>	<u>MCPA: 0.67</u> <u>MCPP:0.13</u> <u>Dicamba: 0.06</u>
	<u>2217-792</u>	<u>MCPA: 0.34</u> <u>MCPP:0.31</u> <u>Dicamba: 0.07</u>

<u>Batch 15</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
–	<u>228-286</u>	<u>MCPA: 0.750</u> <u>MCPP: 0.145</u> <u>Dicamba: 0.072</u>
	<u>228-299</u>	<u>MCPA: 0.646</u> <u>MCPP: 0.255</u> <u>Dicamba: 0.064</u>
	<u>228-304</u>	<u>MCPA: 0.404</u> <u>MCPP: 0.079</u> <u>Dicamba: 0.036</u>
	<u>228-327</u>	<u>MCPA: 0.701</u> <u>MCPP: 0.080</u> <u>Dicamba: 0.069</u>

<u>Batch 16</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
–	<u>9779-262</u>	<u>48.89</u>
	<u>42750-14</u>	<u>48.89</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-204</u>	<u>MCPA: 3.31</u> <u>MCPP: 3.26</u> <u>Dichlorprop: 3.22</u>
	<u>228-206</u>	<u>MCPA: 17.15</u> <u>MCPP: 8.47</u> <u>Dichlorprop: 8.34</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-215</u>	<u>MCPA: 1.65</u> <u>MCPP: 1.63</u> <u>Dichlorprop: 1.61</u>
	<u>228-217</u>	<u>MCPA: 4.78</u> <u>MCPP: 2.36</u> <u>Dichlorprop: 2.33</u>
	<u>228-218</u>	<u>MCPA: 1.41</u> <u>MCPP: 1.39</u> <u>Dichlorprop: 1.37</u>
	<u>228-262</u>	<u>MCPA: 40.42</u> <u>MCPP: 7.99</u> <u>Dicamba: 3.97</u>
	<u>228-266</u>	<u>MCPA: 14.0</u> <u>MCPP: 10.0</u>
	<u>228-276</u>	<u>MCPA: 6.46</u> <u>MCPP: 2.50</u> <u>Dicamba: 0.63</u>
	<u>228-277</u>	<u>MCPA: 3.23</u> <u>MCPP: 1.28</u> <u>Dicamba: 0.31</u>
	<u>228-279</u>	<u>95.5</u>
	<u>228-284</u>	<u>MCPA: 0.67</u> <u>MCPP: 0.27</u> <u>Dicamba: 0.06</u>
	<u>228-296</u>	<u>MCPA: 32.6</u> <u>Dicamba: 16.0</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-303</u>	<u>MCPA: 1.01</u> <u>MCPP: 0.40</u> <u>Dicamba: 0.09</u>
	<u>228-313</u>	<u>MCPA: 48.99</u> <u>Triclopyr: 5.59</u> <u>Dicamba: 4.82</u>
	<u>228-323</u>	<u>MCPA: 48.13</u> <u>Clopyralid: 5.18</u> <u>Dicamba: 4.73</u>
	<u>228-328</u>	<u>MCPA: 1.10</u> <u>Triclopyr: 0.12</u> <u>Dicamba: 0.11</u>
	<u>228-333</u>	<u>MCPA: 48.13</u> <u>Clopyralid: 2.58</u> <u>Dicamba: 4.73</u>
	<u>228-335</u>	<u>MCPA: 10.97</u> <u>Triclopyr: 1.25</u> <u>Dicamba: 1.08</u>
	<u>228-336</u>	<u>MCPA: 0.740</u> <u>Triclopyr: 0.084</u> <u>Dicamba: 0.072</u>
	<u>228-351</u>	<u>MCPA: 0.843</u> <u>Clopyralid: 0.090</u> <u>Dicamba: 0.082</u>
	<u>228-352</u>	<u>MCPA: 0.707</u> <u>Clopyralid: 0.076</u> <u>Dicamba: 0.069</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-353</u>	<u>MCPA: 1.300</u> <u>Clopyralid: 0.140</u> <u>Dicamba: 0.128</u>
	<u>228-371</u>	<u>MCPA: 37.9</u> <u>Triclopyr: 3.8</u> <u>Clopyralid: 1.3</u>
	<u>228-372</u>	<u>MCPA: 47.77</u> <u>Clopyralid: 2.53</u> <u>Dichlorprop: 9.54</u>
	<u>228-411</u>	<u>MCPA: 46.87</u> <u>Triclopyr: 10.68</u> <u>Dichlorprop: 9.12</u>
	<u>228-419</u>	<u>MCPA: 51.05</u> <u>Fluroxypyr: 12.00</u> <u>Dicamba: 4.17</u>
	<u>239-2621</u>	<u>MCPA: 7.36</u> <u>MCP: 13.41</u> <u>Dicamba: 1.49</u>
	<u>239-2634</u>	<u>MCPA: 0.15</u> <u>MCP: 0.30</u> <u>Dicamba: 0.03</u>
	<u>432-892</u>	<u>MCPA: 34.47</u> <u>MCP: 16.35</u> <u>Dicamba: 3.76</u>
	<u>1386-587</u>	<u>MCPA: 52.2</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>2217-720</u>	<u>MCPA: 19.07</u> <u>MCPP: 17.37</u> <u>Dicamba: 3.85</u>
	<u>2217-721</u>	<u>MCPA: 34.47</u> <u>MCPP: 8.18</u> <u>Dicamba: 3.76</u>
	<u>2217-729</u>	<u>MCPA: 38.28</u> <u>MCPP: 12.60</u>
	<u>2217-731</u>	<u>MCPA: 5.608</u> <u>MCPP: 1.335</u> <u>Dicamba: 0.614</u>
	<u>2217-732</u>	<u>MCPA: 7.35</u> <u>MCPP: 6.71</u> <u>Dicamba: 1.47</u>
	<u>2217-733</u>	<u>MCPA: 3.77</u> <u>MCPP: 3.43</u> <u>Dicamba: 0.76</u>
	<u>2217-734</u>	<u>MCPA: 9.43</u> <u>MCPP: 2.24</u> <u>Dicamba: 1.03</u>
	<u>2217-735</u>	<u>MCPA: 6.98</u> <u>MCPP: 2.30</u>
	<u>2217-736</u>	<u>MCPA: 1.029</u> <u>MCPP: 0.932</u> <u>Dicamba: 0.205</u>
	<u>2217-738</u>	<u>MCPA: 3.638</u> <u>MCPP: 1.198</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>2217-743</u>	<u>MCPA: 0.353</u> <u>MCPP: 0.321</u> <u>Dicamba: 0.071</u>
	<u>2217-744</u>	<u>MCPA: 0.98</u> <u>MCPP: 0.23</u> <u>Dicamba: 0.11</u>
	<u>2217-745</u>	<u>MCPA: 1.20</u> <u>Mecoprop: 0.40</u>
	<u>2217-773</u>	<u>MCPA: 38.68</u> <u>MCPP: 8.16</u> <u>Dicamba: 3.81</u>
	<u>2217-785</u>	<u>MCPA: 2.05</u> <u>MCPP: 1.86</u> <u>Dicamba: 0.41</u>
	<u>2217-786</u>	<u>MCPA: 5.63</u> <u>MCPP: 1.33</u> <u>Dicamba: 0.61</u>
	<u>2217-797</u>	<u>MCPA: 6.21</u> <u>Monosodium</u> <u>methanearsonate: 18.70</u> <u>MCPP: 3.09</u> <u>Dicamba: 1.48</u>
	<u>7969-78</u>	<u>MCPA: 6.2</u> <u>Sodium Bentazon: 37.0</u>
	<u>8660-227</u>	<u>MCPA: 0.318</u> <u>MCPP: 0.314</u> <u>2,4-DP: 0.310</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>62719-62</u>	<u>MCPA: 63.5</u>

MCPA 2-ethylhexyl ester (PC Code 030564)

<u>Batch 1</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-267</u>	<u>91.0</u>
	<u>228-289</u>	<u>97.0</u>
	<u>11685-15</u>	<u>93.0</u>
	<u>11685-24</u>	<u>97.0</u>
	<u>15440-9</u>	<u>97.5</u>
	<u>35935-10</u>	<u>94.0</u>
	<u>62719-64</u>	<u>95.8</u>
	<u>67591-3</u>	<u>99.9</u>

<u>Batch 2</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
-	<u>228-156</u>	<u>68.7</u>
	<u>1381-98</u>	<u>68.7</u>
	<u>9779-265</u>	<u>69.7</u>
	<u>11685-21</u>	<u>67.9</u>
	<u>42750-23</u>	<u>69.7</u>
	<u>71368-56</u>	<u>67.9</u>

<u>Batch 3</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
–	<u>35935-20</u>	<u>66.50</u>
	<u>42750-25</u>	<u>66.51</u>
	<u>71368-16</u>	<u>65.30</u>

<u>Batch 4</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-317</u>	<u>MCPA: 56.14</u> <u>Triclopyr: 5.00</u> <u>Dicamba: 3.60</u>
	<u>228-395</u>	<u>MCPA: 56.14</u> <u>Triclopyr: 5.00</u> <u>Dicamba: 3.60</u>

<u>Batch 5</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
–	<u>264-438</u>	<u>MCPA: 34.0</u> <u>Bromoxynil: 31.7</u>
	<u>5905-550</u>	<u>MCPA: 34.0</u> <u>Bromoxynil: 31.7</u>
	<u>42750-52</u>	<u>MCPA: 34.0</u> <u>Bromoxynil: 31.7</u>
	<u>51036-254</u>	<u>MCPA: 34.0</u> <u>Bromoxynil: 31.7</u>
	<u>71368-28</u>	<u>MCPA: 34.0</u> <u>Bromoxynil: 31.7</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>228-203</u>	<u>MCPA: 1.0</u> <u>Mecoprop: 0.6</u>
	<u>228-205</u>	<u>MCPA: 25.6</u> <u>Mecoprop: 25.0</u> <u>2,4-DP: 24.2</u>
	<u>264-649</u>	<u>MCPA: 32.11</u> <u>Fenoxaprop-p-ethyl: 4.41</u> <u>2,4-D: 10.35</u>
	<u>264-654</u>	<u>MCPA: 37.66</u> <u>Fenoxaprop-p-ethyl: 5.29</u>
	<u>264-655</u>	<u>MCPA: 49.43</u> <u>Fenoxaprop-p-ethyl: 2.64</u>
	<u>264-690</u>	<u>MCPA: 40.0</u> <u>Bromoxynil octanoate: 18.7</u> <u>Bromoxynil heptanoate: 18.1</u>
	<u>264-699</u>	<u>MCPA: 30.7</u> <u>Bromoxynil octanoate: 18.5</u> <u>Bromoxynil heptanoate: 17.9</u>
	<u>554-125</u>	<u>74.93</u>
	<u>1381-175</u>	<u>MCPA: 43.03</u> <u>Carfentrazone-ethyl: 1.39</u>
	<u>2217-803</u>	<u>MCPA: 26.83</u> <u>MCP: 3.44</u> <u>Dicamba: 1.72</u>

<u>No Batch</u>	<u>EPA Reg. No.</u>	<u>% Active Ingredient</u>
	<u>2217-834</u>	<u>MCPA: 41.98</u> <u>MCPP: 5.39</u> <u>Dicamba: 2.69</u> <u>Carfentrazone-ethyl: 0.48</u>
	<u>2217-863</u>	<u>MCPA: 31.55</u> <u>MCPP: 6.16</u> <u>Dicamba: 1.65</u> <u>Carfentrazone-ethyl: 0.22</u>
	<u>2217-865</u>	<u>MCPA: 0.337</u> <u>MCPP: 0.066</u> <u>Dicamba: 0.018</u> <u>Carfentrazone-ethyl: 0.002</u>
	<u>2217-873</u>	<u>MCPA: 43.09</u> <u>MCPP: 5.64</u> <u>Carfentrazone-ethyl: 0.50</u>
	<u>5905-506</u>	<u>74.4</u>
	<u>62719-59</u>	<u>74.4</u>
	<u>62719-86</u>	<u>MCPA: 43.4</u> <u>Clopyralid: 5.0</u>
	<u>62719-307</u>	<u>MCPA: 52.0</u> <u>Fluroxypyr: 12.0</u>
	<u>62719-513</u>	<u>MCPA: 43.4</u> <u>Clopyralid: 5.0</u> <u>Fluroxypyr: 26.2</u>
	<u>71368-17</u>	<u>81.9</u>

Appendix H. List of Registrants Sent This Data Call-In

Appendix I. LIST OF AVAILABLE RELATED DOCUMENTS AND ELECTRONICALLY AVAILABLE FORMS

Pesticide Registration Forms are available at the following EPA internet site:

<http://www.epa.gov/opprd001/forms/>

Pesticide Registration Forms (These forms are in PDF format and require the Acrobat reader)

Instructions

1. Print out and complete the forms. (Note: Form numbers that are bolded can be filled out on your computer then printed.)
2. The completed form(s) should be submitted in hardcopy in accord with the existing policy.
3. Mail the forms, along with any additional documents necessary to comply with EPA regulations covering your request, to the address below for the Document Processing Desk.

DO NOT fax or e-mail any form containing 'Confidential Business Information' or 'Sensitive Information.'

If you have any problems accessing these forms, please contact Nicole Williams at (703) 308-5551 or by e-mail at williams.nicole@epa.gov.

The following Agency Pesticide Registration Forms are currently available via the internet:
at the following locations:

8570-1	Application for Pesticide Registration/Amendment	http://www.epa.gov/opprd001/forms/8570-1.pdf
8570-4	Confidential Statement of Formula	http://www.epa.gov/opprd001/forms/8570-4.pdf

8570-5	Notice of Supplemental Registration of Distribution of a Registered Pesticide Product	http://www.epa.gov/opprd001/forms/8570-5.pdf
8570-17	Application for an Experimental Use Permit	http://www.epa.gov/opprd001/forms/8570-17.pdf
8570-25	Application for/Notification of State Registration of a Pesticide To Meet a Special Local Need	http://www.epa.gov/opprd001/forms/8570-25.pdf
8570-27	Formulator's Exemption Statement	http://www.epa.gov/opprd001/forms/8570-27.pdf
8570-28	Certification of Compliance with Data Gap Procedures	http://www.epa.gov/opprd001/forms/8570-28.pdf
8570-30	Pesticide Registration Maintenance Fee Filing	http://www.epa.gov/opprd001/forms/8570-30.pdf
8570-32	Certification of Attempt to Enter into an Agreement with other Registrants for Development of Data	http://www.epa.gov/opprd001/forms/8570-32.pdf
8570-34	Certification with Respect to Citations of Data (PR Notice 98-5)	http://www.epa.gov/opppmsd1/PR_Notices/pr98-5.pdf
8570-35	Data Matrix (PR Notice 98-5)	http://www.epa.gov/opppmsd1/PR_Notices/pr98-5.pdf
8570-36	Summary of the Physical/Chemical Properties (PR Notice 98-1)	http://www.epa.gov/opppmsd1/PR_Notices/pr98-1.pdf
8570-37	Self-Certification Statement for the Physical/Chemical Properties (PR Notice 98-1)	http://www.epa.gov/opppmsd1/PR_Notices/pr98-1.pdf

Pesticide Registration Kit

www.epa.gov/pesticides/registrationkit/

Dear Registrant:

For your convenience, we have assembled an online registration kit which contains the following pertinent forms and information needed to register a pesticide product with the U.S. Environmental Protection Agency's Office of Pesticide Programs (OPP):

1. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Food, Drug and Cosmetic Act (FFDCA) as Amended by the Food Quality Protection Act (FQPA) of 1996.
2. Pesticide Registration (PR) Notices
 - a. 83-3 Label Improvement Program--Storage and Disposal Statements
 - b. 84-1 Clarification of Label Improvement Program
 - c. 86-5 Standard Format for Data Submitted under FIFRA
 - d. 87-1 Label Improvement Program for Pesticides Applied through Irrigation Systems (Chemigation)
 - e. 87-6 Inert Ingredients in Pesticide Products Policy Statement
 - f. 90-1 Inert Ingredients in Pesticide Products; Revised Policy Statement
 - g. 95-2 Notifications, Non-notifications, and Minor Formulation Amendments
 - h. 98-1 Self Certification of Product Chemistry Data with Attachments (This document is in PDF format and requires the Acrobat reader.)

Other PR Notices can be found at http://www.epa.gov/opppmsd1/PR_Notices

3. Pesticide Product Registration Application Forms (These forms are in PDF format and will require the Acrobat reader).
 - a. EPA Form No. 8570-1, Application for Pesticide Registration/Amendment
 - b. EPA Form No. 8570-4, Confidential Statement of Formula
 - c. EPA Form No. 8570-27, Formulator's Exemption Statement
 - d. EPA Form No. 8570-34, Certification with Respect to Citations of Data
 - e. EPA Form No. 8570-35, Data Matrix
4. General Pesticide Information (Some of these forms are in PDF format and will require the Acrobat reader).
 - a. Registration Division Personnel Contact List
 - a. Biopesticides and Pollution Prevention Division (BPPD) Contacts
 - b. Antimicrobials Division Organizational Structure/Contact List

- d. 53 F.R. 15952, Pesticide Registration Procedures; Pesticide Data Requirements (PDF format)
- e. 40 CFR Part 156, Labeling Requirements for Pesticides and Devices (PDF format)
- f. 40 CFR Part 158, Data Requirements for Registration (PDF format)
- g.. 50 F.R. 48833, Disclosure of Reviews of Pesticide Data (November 27, 1985)

Before submitting your application for registration, you may wish to consult some additional sources of information. These include:

1. The Office of Pesticide Programs' website.
2. The booklet "General Information on Applying for Registration of Pesticides in the United States", PB92-221811, available through the National Technical Information Service (NTIS) at the following address:

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161

The telephone number for NTIS is (703) 605-6000.

3. The National Pesticide Information Retrieval System (NPIRS) of Purdue University's Center for Environmental and Regulatory Information Systems. This service does charge a fee for subscriptions and custom searches. You can contact NPIRS by telephone at (765) 494-6614 or through their website.
4. The National Pesticide Telecommunications Network (NPTN) can provide information on active ingredients, uses, toxicology, and chemistry of pesticides. You can contact NPTN by telephone at (800) 858-7378 or through their website: ace.orst.edu/info/nptn.

The Agency will return a notice of receipt of an application for registration or amended registration, experimental use permit, or amendment to a petition if the applicant or

petitioner encloses with his submission a stamped, self-addressed postcard. The postcard must contain the following entries to be completed by OPP:

- a. Date of receipt;
- b. EPA identifying number; and
- c. Product Manager assignment.

Other identifying information may be included by the applicant to link the acknowledgment of receipt to the specific application submitted. EPA will stamp the date of receipt and provide the EPA identifying file symbol or petition number for the new submission. The identifying number should be used whenever you contact the Agency concerning an application for registration, experimental use permit, or tolerance petition.

To assist us in ensuring that all data you have submitted for the chemical are properly coded and assigned to your company, please include a list of all synonyms, common and trade names, company experimental codes, and other names which identify the chemical (including "blind" codes used when a sample was submitted for testing by commercial or academic facilities). Please provide a chemical abstract system (CAS) number if one has been assigned.

Appendix I. List of Available Related Documents and Electronically Available Forms

Pesticide Registration Forms are available at the following EPA internet site:

<http://www.epa.gov/opprd001/forms/>

Instructions

1. Print out and complete the forms. (Note: Form numbers that are bolded can be filled out on your computer then printed.)
2. The completed form(s) should be submitted in hardcopy in accord with the existing policy.
3. Mail the forms, along with any additional documents necessary to comply with EPA regulations covering your request, to the address below for the Document Processing Desk.

DO NOT fax or e-mail any form containing 'Confidential Business Information' or 'Sensitive Information.'

If you have any problems accessing these forms, please contact Nicole Williams at (703) 308-5551 or by e-mail at williams.nicole@epa.gov.

The following Agency Pesticide Registration Forms are currently available via the internet:

8570-1	Application for Pesticide Registration/Amendment	http://www.epa.gov/opprd001/forms/8570-1.pdf
8570-4	Confidential Statement of Formula	http://www.epa.gov/opprd001/forms/8570-4.pdf
8570-5	Notice of Supplemental Registration of Distribution of a Registered Pesticide Product	http://www.epa.gov/opprd001/forms/8570-5.pdf
8570-17	Application for an Experimental Use Permit	http://www.epa.gov/opprd001/forms/8570-17.pdf
8570-25	Application for/Notification of State Registration of a Pesticide To Meet a Special Local Need	http://www.epa.gov/opprd001/forms/8570-25.pdf

8570-27	Formulator's Exemption Statement	http://www.epa.gov/opprd001/forms/8570-27.pdf
8570-28	Certification of Compliance with Data Gap Procedures	http://www.epa.gov/opprd001/forms/8570-28.pdf
8570-30	Pesticide Registration Maintenance Fee Filing	http://www.epa.gov/opprd001/forms/8570-30.pdf
8570-32	Certification of Attempt to Enter into an Agreement with other Registrants for Development of Data	http://www.epa.gov/opprd001/forms/8570-32.pdf
8570-34	Certification with Respect to Citations of Data (PR Notice 98-5)	http://www.epa.gov/opppmsd1/PR_Notices/pr98-5.pdf
8570-35	Data Matrix (PR Notice 98-5)	http://www.epa.gov/opppmsd1/PR_Notices/pr98-5.pdf
8570-36	Summary of the Physical/Chemical Properties (PR Notice 98-1)	http://www.epa.gov/opppmsd1/PR_Notices/pr98-1.pdf
8570-37	Self-Certification Statement for the Physical/Chemical Properties (PR Notice 98-1)	http://www.epa.gov/opppmsd1/PR_Notices/pr98-1.pdf

Pesticide Registration Kit

www.epa.gov/pesticides/registrationkit/

Dear Registrant:

For your convenience, we have assembled an online registration kit which contains the following pertinent forms and information needed to register a pesticide product with the U.S. Environmental Protection Agency's Office of Pesticide Programs (OPP):

1. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Food, Drug and Cosmetic Act (FFDCA) as Amended by the Food Quality Protection Act (FQPA) of 1996.
2. Pesticide Registration (PR) Notices
 - a. 83-3 Label Improvement Program – Storage and Disposal Statements
 - b. 84-1 Clarification of Label Improvement Program
 - c. 86-5 Standard Format for Data Submitted under FIFRA
 - d. 87-1 Label Improvement Program for Pesticides Applied Through Irrigation Systems (Chemigation)
 - e. 87-6 Inert Ingredients in Pesticide Products Policy Statement
 - f. 90-1 Inert Ingredients in Pesticide Products; Revised Policy Statement

- g. 95-2 Notifications, Non-notifications, and Minor Formulation Amendments
- h. 98-1 Self Certification of Product Chemistry Data with Attachments (This document is in PDF format and requires Acrobat reader.)

Other PR Notices can be found at http://www.epa.gov/opppmsd1/PR_Notices Pesticide Product Registration Application Forms (These forms are in PDF format and will require the Acrobat reader).

- a. EPA Form No. 8570-1, Application for Pesticide Registration/Amendment
 - b. EPA Form No. 8570-4, Confidential Statement of Formula
 - c. EPA Form No. 8570-27, Formulator's Exemption Statement
 - d. EPA Form No. 8570-34, Certification with Respect to Citations of Data
 - e. EPA Form No. 8570-35, Data Matrix
4. General Pesticide Information (Some of these forms are in PDF format and will require the Acrobat reader).
- a. Registration Division Personnel Contact List
 - b. Biopesticides and Pollution Prevention Division (BPPD) Contacts
 - c. Antimicrobials Division Organizational Structure/Contact List
 - d. 53 F.R. 15952, Pesticide Registration Procedures; Pesticide Data Requirements (PDF format)
 - e. 40 CFR Part 156, Labeling Requirements for Pesticides and Devices (PDF format)
 - f. 40 CFR Part 158, Data Requirements for Registration (PDF format)
 - g. 50 F.R. 48833, Disclosure of Reviews of Pesticide Data (November 27, 1985)

Before submitting your application for registration, you may wish to consult some additional sources of information. These include:

1. The Office of Pesticide Programs' website.
2. The booklet "General Information on Applying for Registration of Pesticides in the United States", PB92-221811, available through the National Technical Information Service (NTIS) at the following address:

National Technical Information Service (NTIS)

5285 Port Royal Road
Springfield, VA 22161

The telephone number for NTIS is (703) 605-6000.

3. The National Pesticide Information Retrieval System (NPIRS) of Purdue University's Center for Environmental and Regulatory Information Systems. This service does charge a fee for subscriptions and custom searches. You can contact NPIRS by telephone at (765) 494-6614 or through their website.
4. The National Pesticide Telecommunications Network (NPTN) can provide information on active ingredients, uses, toxicology, and chemistry of pesticides. You can contact NPTN by telephone at (800) 858-7378 or through their website: ace.orst.edu/info/nptn.

The Agency will return a notice of receipt of an application for registration or amended registration, experimental use permit, or amendment to a petition if the applicant or petitioner encloses with his submission a stamped, self-addressed postcard. The postcard must contain the following entries to be completed by OPP:

1. Date of receipt;
2. EPA identifying number; and
3. Product Manager assignment.

Other identifying information may be included by the applicant to link the acknowledgment of receipt to the specific application submitted. EPA will stamp the date of receipt and provide the EPA identifying file symbol or petition number for the new submission. The identifying number should be used whenever you contact the Agency concerning an application for registration, experimental use permit, or tolerance petition.

To assist us in ensuring that all data you have submitted for the chemical are properly coded and assigned to your company, please include a list of all synonyms, common and trade names, company experimental codes, and other names which identify the chemical (including "blind" codes used when a sample was submitted for testing by commercial or academic facilities). Please provide a chemical abstract system (CAS) number if one has been assigned.

