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

OFFICE OF
PREVENTION, PESTICIDES, AND
TOXIC SUBSTANCES

MEMORANDUM

DATE: 15 NOV 2005

SUBJECT: Petition Number: 4F6950 -- **Human Health Risk Assessment for Dichlormid-** Request for Establishing Permanent Tolerances for Dichlormid on Corn.

DP Barcode:	D321928	Decision #:	357395
PC Code:	900497	Class:	Herbicide Safener
Trade Names:	Surpass™ EC	EPA Reg. Nos.:	62719-367
	Keystone8™		62719-368
	TopNotch™		62719-369
	Surpass™ 20G		62719-370
	FulTime™		62719-371
	Surpass™ 7 E		62719-372
	Keystone™ LA		62719-373

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THRU: William Cutchin, Chemist
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Dow AgroSciences, LLC is requesting that current time-limited tolerances of the herbicide safener dichlormid, N,N-diallyl dichloroacetamide, be converted to permanent tolerances for use in/on field corn raw agricultural commodities (RACs). Dichlormid is an inert ingredient (safener) in pesticide formulations and may be applied to corn fields before and after corn plants emerge from the soil. This is the only registered use. Products containing dichlormid are conditionally registered in the U.S. under the trade names Surpass™ EC, Keystone8™, TopNotch™, Surpass™ 20G, FulTime, Surpass™ 7 E, and Keystone™ LA.

This risk assessment incorporates all current, pending, and proposed tolerances for dichlormid as of November 8, 2005.

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1.0. EXECUTIVE SUMMARY

General Background

Dichlormid is a herbicide safener used in pesticide formulations with the active ingredient, acetochlor, for the control of grass and broadleaf weeds. Current time-limited tolerances that Health Effects Division (HED) supports for the use of the herbicide safener, dichlormid, are the following:

Commodity:	ppm
Corn, field, forage	0.05
Corn, field, grain	0.05
Corn, field, stover	0.05
Corn, pop, grain	0.05
Corn, pop, stover	0.05
Corn, sweet, forage	0.05
Corn, sweet, grain	0.05
Corn, sweet, stover	0.05

These tolerances are set to expire at the end of the 2005 calendar year. There are no new tolerances requested in this petition, only the request for the conversion of time-limited tolerances to permanent tolerances.

The most recent human health risk assessment for dichlormid was conducted by Registration Action Branch 1 (RAB1) (PP# 6F3344, DP Barcode: D248305, S. Chun, 09/21/1999) for an extension of the dichlormid time-limited tolerance use on corn.

Hazard Assessment

In acute toxicity studies, dichlormid exhibits low to moderate toxicity, depending on the route of exposure. Dichlormid is of moderate toxicity by the oral and dermal routes (III) and low toxicity by inhalation (IV) in rats. Dichlormid technical is relatively non-irritating to the eye (III) and causes moderate dermal irritation (toxicity category II) in rabbits. Dichlormid is a mild dermal sensitizer.

The toxicology database provides no evidence of carcinogenetic effects based on a combined chronic toxicity/carcinogenicity study in rats. No DNA synthesis could be induced in Unscheduled DNA Synthesis studies performed with rats. Dichlormid is mutagenic into the cytotoxic range based on an *in vitro* assay in mouse lymphoma cells.

Previously, the HIARC concluded that there is qualitative evidence of increased susceptibility demonstrated following *in utero* exposure in the prenatal developmental toxicity study in rabbits, since fetal effects observed (resorptions, decreased live fetuses per litter, and decreased fetal body weight) are considered to be more severe than those observed in maternal animals

(increased alopecia, decreased body weight gain and food consumption). At this time the toxicity database was incomplete - there were data gaps for the 2-generation reproduction study in rats and acute and subchronic neurotoxicity studies. Based on this hazard assessment, with no consideration of the exposure assessments, the HIARC recommended that the **FQPA SF be retained at 10x** for enhanced sensitivity to infants and children since there is qualitative evidence of increased susceptibility in the rabbit developmental study. Although the data gap has since been addressed, metabolism studies are still needed to reassess reducing the FQPA SF.

For chronic dietary exposure only, an additional 3x UF was included in the previous dietary risk assessment due to a data gap for the chronic toxicity study in dogs. Although this study has since been submitted and reviewed, no determination can be made at this time as to the appropriateness of the UF. For purposes of the dichlormid dietary risk assessment, the additional 3x UF has been included, but, it can be reevaluated at a later date for the next dichlormid action.

There are still outstanding data gaps for dichlormid including subchronic dermal and inhalation, neurotoxicity and metabolism studies. Dermal absorption is by default 100% due to neither a dermal absorption nor a dermal toxicity study (for extrapolation) being available. Chemistry data that need to be submitted are noted in another TRB memo (DP Barcode: D318075 & D357398, D. Rate, 09/14/2005).

Dose Response Assessment

The acute dietary endpoint is based on decreased body weight gain and food consumption, noted in a developmental toxicity study in rats. The short- and intermediate-term incidental oral endpoints are based on decreased body weight, food consumption, and feed efficiency. Chronic dietary and long-term endpoints are based on skeletal muscle fiber degeneration and increased severity and/or incidence of vacuolation of the adrenal cortex, noted in a Chronic Toxicity Study in Dogs.

Cancer

Dichlormid has not been classified by the Hazard Identification Assessment and Review Committee (HIARC) or HED Cancer Assessment Review Committee (CARC) in terms of potential for carcinogenicity. Therefore, no chronic (cancer) aggregate human health risk assessment was completed with this action.

Residential Exposure

There are no existing or proposed residential uses for dichlormid.

Occupational Handler Exposure Assessment

The herbicide safener formulations are typically applied as pre-emergence soil or early post-emergence foliar applications using broadcast ground equipment. The HIARC has

identified toxicological endpoints of concern for occupational exposure. Handler exposures addressing mixer/loaders and applicators have been assessed using surrogate data available in the Pesticide Handlers Exposure Database (PHED Ver 1.1) Surrogate Table. Since no potentially significant post-application exposure is expected based on the use pattern, this exposure assessment was not conducted. Short- and intermediate-term exposures are expected for workers applying dichlormid. Based on use pattern, long-term exposure is not expected. All occupational exposure scenarios yielded risk estimates below HED's level of concern for dichlormid.

Margin of Exposure (MOE)

An MOE of 100 is adequate for occupational exposure risk assessment.

Occupational Post-Application

A post-application exposure assessment was not performed. Cultural activities associated with the subject corn uses are likely to result in relatively low levels of dermal exposure. Field corn is planted, cultivated, and harvested mechanically (*website:* Crop Profiles, USDA, Office of Pest Management Policy and Pest Impact Assessment Program, updated 8/23/99). Therefore, potential worker post-application exposures from a herbicide applied pre-emergent or in the early post-emergent stage are expected to be minimal.

Dietary Risk Estimates

Acute and chronic dietary exposure analyses for dichlormid were performed using the Dietary Exposure Evaluation Model (DEEM-FCID Version 2.02). Acute dietary risk estimates were 3.4% of the aPAD at the 95th percentile for the general U.S. population and 7.5% of the aPAD for the highest exposure group, all infants (< 1 year old). Chronic dietary risk estimates were 6.1% of the cPAD for the general U.S. population and 15% of the cPAD for the highest exposure group, children 3-5 years old. **Neither the acute or chronic analyses exceed HED's level of concern** (PP# 4F6950, DP Barcode: D321927, B. Hanson, 11/07/2005).

Drinking Water

Drinking water level of comparison's (DWLOCs) were calculated by TRB for acute and chronic aggregate exposures to dichlormid. The Environmental Fate and Effects Division (EFED) provided ground and surface water exposure estimates for the use of dichlormid on corn (DP Barcode: D258095, A. Clem, 8/3/99). Surface water estimated environmental concentrations (EEC) for both acute and chronic exposures were calculated to be 27.29 and 8.98, respectively. Acute drinking water concentrations in shallow ground water on highly vulnerable sites was determined to be 0.046 ppb. Chronic concentrations are not expected to be higher than acute values for ground water exposure.

For acute exposure, TRB calculated DWLOCs for the U.S. population and all infants (< 1 year

old) to be 338 ppb and 92 ppb, respectively. For chronic exposure, TRB calculated DWLOCs for the U.S. population and children (3-5 years old) to be 56 and 15 ppb, respectively. The maximum **estimated concentrations of dichlormid in surface and ground water are less than HED's DWLOCs for dichlormid** as a contribution to both acute and chronic aggregate exposure.

Aggregate Exposure and Risk Assessment

Aggregate exposure risk assessments were performed for the following: acute aggregate exposure (food + water) and chronic aggregate exposure (food + water). There are no residential uses resulting in non-dietary exposure to infants and children at this time and so a short-/intermediate-term aggregate risk assessment is *not* applicable for this dichlormid action. A cancer aggregate risk assessment was *not* performed because neither the HIARC or HED CARC have classified dichlormid in terms of potential for carcinogenicity.

Acute aggregate risk estimates are below HED's level of concern. The acute aggregate risk assessment takes into account exposure estimates from dietary consumption of dichlormid (food and drinking water). A Tier 1 acute dietary risk assessment was performed assuming tolerance level residues, default processing factors for all commodities and 100% CT. For acute dietary risk, HED's level of concern is >100% aPAD. Acute dietary risk estimates were 3.4% of the aPAD at the 95th percentile for the general U.S. population and 7.5% of the aPAD for the highest exposure group, all infants (< 1 year old). The estimated acute dietary risk associated with the use of dichlormid on corn RACs is below HED's level of concern. Additional refinement by incorporating %CT information may result in even lower exposure estimates.

For acute exposure, TRB calculated DWLOCs for the U.S. population and all infants (< 1 year old) to be 338 ppb and 92 ppb, respectively. The maximum estimated concentrations of dichlormid in surface, 27.29, and ground water, 0.046 ppb, are less than HED's DWLOCs for dichlormid as a contribution to acute aggregate exposure. Therefore, taking into account the uses proposed in this action, TRB concludes with reasonable certainty that residues of dichlormid in drinking water would not result in unacceptable levels of acute aggregate human health risk at this time.

A short + intermediate term aggregate risk assessment was not performed because there are no residential uses for dichlormid.

Chronic aggregate risk estimates are below HED's level of concern. A chronic dietary analysis was performed assuming tolerance level residues, default processing factors for all commodities and 100% CT. Chronic dietary risk estimates were 6.1% of the cPAD for the general U.S. population and 15% of the cPAD for the highest exposure group, children 3-5 years old. The estimated chronic dietary risk associated with the use of dichlormid on corn RACs is below HED's level of concern. Additional refinement by incorporating %CT information may result in even lower exposure estimates.

For chronic exposure, TRB calculated DWLOCs for the U.S. population and children (3-5 years old) to be 56 and 15 ppb, respectively. The maximum estimated concentrations of dichlormid in surface, 8.98. and ground water, 0.046 ppb, are less than HED's DWLOCs for dichlormid as a contribution to chronic aggregate exposure. Therefore, taking into account the uses proposed in this action, TRB concludes with reasonable certainty that residues of dichlormid in drinking water would not result in unacceptable levels of chronic aggregate human health risk at this time.

A cancer aggregate risk assessment was not performed because neither the HIARC or HED CARC have classified dichlormid in terms of potential for carcinogenicity.

Recommendation for Tolerances and Registration

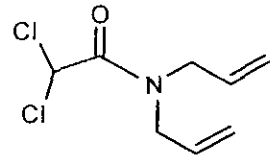
The toxicology and residue chemistry databases are adequate only to support extending the time-limited tolerances for residues of dichlormid. Tolerance expressions are set in terms of the parent compound only. Because no other data exists on the associated metabolites, the recommended time-limited tolerance is based only on the parent compound. For permanent tolerances to be set for the use of dichlormid, residue chemistry deficiencies need to be addressed (DP Barcode: D318075 & D357398, D. Rate, 09/14/2005).

2.0. PHYSICAL/CHEMICAL PROPERTIES CHARACTERIZATION

2.1. Identification of Active Ingredient

Chemical Name:	N,N-diallyl-2,2-dichloroacetamide
Molecular Formula:	$C_8H_{11}C_{12}NO$
Common Name:	Dichlormid
Trade Names:	Surpass™EC; Keystone™; TopNotch™; Surpass™20G; FulTime™; Surpass™ 7 E; Keystone™ LA
Chemical Type:	Herbicide safener
PC Code Number:	900497
CAS Registry No.:	37764-25-3

2.2. Structural Formula of Dichlormid



2.2. Physical and Chemical Properties

Density: 1.1963 g / mL
Vapor Pressure: 6.3 x 10-3 mm Hg at 25 °C
Water Solubility: 4388 mg / L at 25 °C
Octanol/Water Partition Coefficient: log K_{ow} = 1.839

3.0. HAZARD CHARACTERIZATION

The toxicology database for dichlormid, for the purpose of establishing permanent tolerances for field corn (forage, grain, stover), sweet corn (forage, grain, stover) and pop corn (grain, stover) at 0.05 ppm, is not adequate. There are still outstanding data gaps for dichlormid including subchronic dermal and inhalation, neurotoxicity and metabolism studies. Dermal absorption is by default 100% due to neither a dermal absorption nor a dermal toxicity study (for extrapolation) being available. Chemistry data that need to be submitted are noted in another TRB memo (DP Barcode: D318075 & D357398, D. Rate, 09/14/2005).

There is high confidence in the quality of existing studies and the reliability of the toxicity endpoints identified for use in this risk assessment.

3.1. Hazard Profile

The acute toxicity of dichlormid technical is shown in Table1.

Table 1. Acute Toxicity Data on Dichlormid Technical.

Guideline No./ Study Type	MRID No.	Results	Toxicity Category
870.1100 Acute oral toxicity - rat	44606401	LD_{50} = male 2816/female 2146 mg/kg	III
870.1200 Acute dermal toxicity - rat	44606402	LD_{50} = >2000 mg/kg	III
870.1300 Acute inhalation toxicity - rat	44606403	LC_{50} = > 5.5 mg/L (male + female)	IV
870.2400 Acute eye irritation - rabbit	44606404	mild irritant	IV
870.2500 Acute dermal irritation - rabbit	42807902	severe irritant	II
870.2600 Skin sensitization - Guinea pig	44606405	mild sensitizer	

In acute toxicity studies, dichlormid exhibits low to moderate toxicity, depending on the route of exposure. Dichlormid is of moderate toxicity by the oral and dermal routes (III) and low toxicity by inhalation (IV) in rats. Dichlormid technical is relatively non-irritating to the eye (III) and causes moderate dermal irritation (toxicity category II) in rabbits. Dichlormid is a mild dermal sensitizer. Dermal absorption is by default 100% due to neither a dermal absorption nor a dermal toxicity study (for extrapolation) is available.

The toxicology database provides no evidence of carcinogenetic effects based on a combined chronic toxicity/carcinogenicity study in rats. No DNA synthesis could be induced in

Unscheduled DNA Synthesis studies performed with rats. Dichlormid is mutagenic into the cytotoxic range based on an *in vitro* assay in mouse lymphoma cells.

Previously, the HIARC concluded that there is qualitative evidence of increased susceptibility demonstrated following *in utero* exposure in the prenatal developmental toxicity study in rabbits, since fetal effects observed (resorptions, decreased live fetuses per litter, and decreased fetal body weight) are considered to be more severe than those observed in maternal animals (increased alopecia, decreased body weight gain and food consumption). At this time the toxicity database was incomplete - there were data gaps for the 2-generation reproduction study in rats and acute and subchronic neurotoxicity studies. Based on this hazard assessment, with no consideration of the exposure assessments, the HIARC recommended that the **FQPA SF be retained at 10x** for enhanced sensitivity to infants and children since there is qualitative evidence of increased susceptibility in the rabbit developmental study. Although the data gap has since been addressed, metabolism studies are still needed to reassess reducing the FQPA SF.

There are still outstanding data gaps for dichlormid including subchronic dermal and inhalation, neurotoxicity and metabolism studies. Dermal absorption is by default 100% due to neither a dermal absorption nor a dermal toxicity study (for extrapolation) being available. Chemistry data that need to be submitted are noted in another TRB memo (DP Barcode: D318075 & D357398, D. Rate, 09/14/2005).

Dichlormid has not been classified by the HIARC or HED CARC in terms of potential for carcinogenicity. However, there is no evidence of a positive carcinogenic effect in the rat and mouse carcinogenicity studies based on evaluation of the studies.

The toxicity profile of dichlormid is listed in Table 2.

Table 2. Toxicity Profile of Dichlormid Technical.

Guideline No./ Study Type	MRID No. (year)/ Classification /Doses	Results
DICHLORMID		
Dichlormid 870.3100 90-Day oral toxicity - rat	44606461 (1989) Acceptable/guideline 0, 20, 200, 2000 ppm M 0, 1.4, 14, 140 mg/kg/day F 0, 1.6, 16, 150 mg/kg/day	NOAEL = 1.4 mg/kg/day (male), 1.6 mg/kg/day (female), 20 ppm LOAEL = 14 mg/kg/day (male), 16 mg/kg/day (female), 200 ppm based on: minor decreased in body weight gains and food efficiency in females and on increased liver weight and a slightly increased (NS) incidence of liver lipidosis in males.
Dichlormid 870.3150 90-Day oral toxicity - dog	41419401 (1988) Acceptable/guideline capsule 0, 1, 5, 25, 50 mg/kg/day	NOAEL = 5 mg/kg/day (male, female) LOAEL = 25 mg/kg/day (male/female) based on: decreased body weight gains, hematological and clinical chemistry alternations, liver toxicity and voluntary muscle pathological changes.

Table 2. Toxicity Profile of Dichlormid Technical.		
Guideline No./ Study Type	**MRID No. (year)/ Classification /Doses**	**Results**
Dichlormid 870.3465 Inhalation - 14 week - rat	00155678 (1983) Acceptable/guideline 0, 2, 19.9, 192.5 mg/L/day	NOAEL = 2 mg/L/day (male, female) LOAEL = 19.9 mgL/day (male/female) based on: clinical signs, gross pathology, opthamology, liver and kidney weights and non-neoplastic histology.
Dichlormid 870.3700 Develpmental Toxicity Study - rat	44606408 (1989) Acceptable/guideline 0, 10, 40, 160 mg/kg/day	Maternal NOAEL = 10 mg/kg/day Maternal LOAEL = 40 mg/kg/day based on: decreased mean absolute body weights, body weight gains, and food consumption. Developmental NOAEL = 40 mg/kg/day Developmental LOAEL = 160 mg/kg/day based on: marginal increased in skeletal anomalies.
Dichlormid 870.3700 Develpmental Toxicity Study - rabbit	44606407 (1989) Acceptable/guideline 0, 5, 30, 180 mg/kg/day	Maternal NOAEL = 30 mg/kg/day Maternal LOAEL = 180 mg/kg/day based on: increased incidence of alopecia and decreased mean maternal body weight gains and food consumption. Developmental NOAEL = 30 mg/kg/day Developmental LOAEL = 180 mg/kg/day based on: increases in post-implantation loss accompanied by an increase number of resorptions/doe (both early and late resorptions), decreased number of live/fetuses/litter, slightly decreased mean fetal body weights.
Dichlormid 870.3800 Reproduction and fertility effects - rat	46353801 (2000) Acceptable/guideline 0, 15, 75, 500 ppm M_0 0, 1.5, 7.4, 48.5 mg/kg/day M_1 0, 1.8, 8.9, 59.4 mg/kg/day F_0 0,1.6, 8.0, 52.1 mg/kg/day F_1 0, 1.9, 9.4, 63.0 mg/kg/day	**Parental/Systemic** NOAEL = 7.4 mg/kg/day (male), 8.0 mg/kg/day (female), 75 ppm LOAEL = 48.5 mg/kg/day (male), 52.1 mg/kg/day (female), 500 ppm based on: minimal increased liver weight, minimal decreased weight gain, minimal decreased in food consumption. **Reproductive** NOAEL = 48.5 mg/kg/day (male), 52.1mg/kg/day (female), >500 ppm LOAEL = cannot be determined **Offspring** NOAEL = 7.4 mg/kg/day (male), 8.0 mg/kg/day (female), 75 ppm LOAEL = 48.5 mg/kg/day (male), 52.1 (female), 500 ppm based on: increased liver weights.
Dichlormid 870.4200 Carcinogenicity - mouse	44529401 (1998) Acceptable/guidline 0, 10, 50, 500 ppm M 0, 1.4, 7.0, 70.7 mg/kg/day F 0, 18., 9.2, 92.4 mg/kg/day	NOAEL = 7.0 mg/kg/day (male), 9.2 mg/kg/day (female), 50 ppm LOAEL = 70.7 mg/kg/day (male), 92.4 mg/kg/day (female), 500ppm based on changes in reproductive organs and kidney changes in males

Table 2. Toxicity Profile of Dichlormid Technical.		
Guideline No./ Study Type	**MRID No. (year)/ Classification /Doses**	**Results**
Dichlormid 870.4300 Feeding/ Carcinogenicity - rat	44529402, 44751801 (1998) Acceptable/guideline 0, 20, 100, 500 ppm M 0, 1.3, 6.5, 32.8 mg/kg/day F 0, 1.5, 7.5, 37.1, mg/kg/day	NOAEL = 6.5 mg/kg/day (male), 7.5 mg/kg/day (female), 100 ppm LOAEL = 32.8 mg/kg/day (male), 37.1 mg/kg/day (female), 500 ppm based on decreased BWG, decreased FE, increased liver weight, and liver histopath. **No evidence of carcinogenicity.**
Gene Mutation Dichlormid 870.5100 *Salmonella typhimurium* and *Escherichia coli*	41561404 (1987) Acceptable/guideline	In two independent experiments, **dichlormid** (97.2% a.i.) was **not mutagenic** in 4 strains of S. typhimurium at concentrations up to 3000 µg/plate in the presence or absence of S9 activation.
Gene Mutation Dichlormid 870.5300 *In vitro* assay in mammalian cells/mouse lymphoma cells	41561405 (1997) Acceptable/guideline	In two independent experiments, R-25788 (97.2% a.i.) **is mutagenic** in L5178Y mouse lymphoma cells both with and without S9 activation at doses the extend into the cytotoxic range.
Cytogenetics Dichlormid 870.5375 *in vitro*/human lymphocytes	41561407 (1989) Acceptable/guideline	The high dose of 1200 µg/ml induced a => 50% decrease in the mitotic index with or without S9 activation. There was **no evidence** of a clastogenic effect at nay non-activated or S9- activated dose.
Cytogenetics Dichlormid 870.5395 *In vivo* mouse micronucleus assay	41561403 (1997) Acceptable/guideline	There was **no evidence** of a clastogenic or aneugenic effect at any R-25788 dose or at any harvest time.
Cytogenetics Dichlormid 870.5550 Unscheduled DNA Synthesis - rat	44606409 (1988) Acceptable/guideline	There was **no consistent, reproducible evidence** that unscheduled DNA synthesis was induced.
Cytogenetics Dichlormid 870.5550 Unscheduled DNA Synthesis - rat	41561408 (1989) Acceptable/guideline	There was **no evidence** that dichlormid at the selected doses increased the frequency of UDS in treated hepatocytes at either the 2 or 16 hour sacrifice interval.

Table 2. Toxicity Profile of Dichlormid Technical.		
Guideline No./ Study Type	**MRID No. (year)/ Classification /Doses**	**Results**
Dichlormid 870.7600 Dermal penetration	NA	100% by default

3.2. FQPA Considerations

Previously, the HIARC concluded that there is qualitative evidence of increased susceptibility demonstrated following *in utero* exposure in the prenatal developmental toxicity study in rabbits, since fetal effects observed (resorptions, decreased live fetuses per litter, and decreased fetal body weight) are considered to be more severe than those observed in maternal animals (increased alopecia, decreased body weight gain and food consumption). At this time the toxicity database was incomplete - there were data gaps for the 2-generation reproduction study in rats and acute and subchronic neurotoxicity studies. Based on this hazard assessment, with no consideration of the exposure assessments, the HIARC recommended that the **FQPA SF be retained at 10x** for enhanced sensitivity to infants and children since there is qualitative evidence of increased susceptibility in the rabbit developmental study. Although the data gap has since been addressed, metabolism studies are still needed to reassess reducing the FQPA SF.

3.2.1. Cumulative Risk

EPA does not have, at this time, available data to determine whether dichlormid has a common mechanism of toxicity with other substances or how to include this pesticide in a cumulative risk assessment. For the purposes of this tolerance action, therefore, EPA has not assumed that dichlormid has a common mechanism of toxicity with other substances.

On this basis, the petitioner must submit, upon EPA's request and according to a schedule determined by the Agency, such information as the Agency directs to be submitted in order to evaluate issues related to whether dichlormid shares a common mechanism of toxicity with any other substance and, if so, whether any tolerances for dichlormid need to be modified or revoked.

3.2.2. Endocrine Disruption

EPA is required under the Federal Food Drug and Cosmetic Act (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 such endocrine effects as the Administrator may designate." Following the recommendations of its Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC), EPA determined that there was scientific bases 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 the Program include evaluations of potential effects in wildlife. For pesticide chemicals, 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 Agency's EDSP have been developed, dichlormid may be subjected to additional screening and/or testing to better characterize effects related to endocrine disruption.

3.3. Dose Response Assessment

The doses and toxicological endpoints selected for various exposure scenarios are summarized in Table 3.

Table 3. Summary of Toxicological Dose and Endpoints for Dichlormid Use in Human Risk Assessment [1].

Exposure Scenario (Fipronil)	Dose Used in Risk Assessment, UF	FQPA SF and Endpoint for Risk Assessment	Study and Toxicological Effects
Acute Dietary all populations including infants and children	NOAEL= 10 mg/kg UF = 100 **Acute RfD** = 0.10 mg/kg/day	FQPA SF = 10 **aPAD** = acute RfD / FQPA SF = 0.010 mg/kg/day	Developmental Toxicity Study - rat Maternal LOAEL = 40 mg/kg/day based on decreased body weight gain and food consumption (most significant on days 7-10 of dosing)
Chronic Dietary all populations	NOAEL= 5 mg/kg/day UF = 300 **Chronic RfD** = 0.017 mg/kg/day	FQPA SF = 10 **cPAD** = chr RfD / FQPA SF = 0.0017 mg/kg/d	90-Day oral toxicity - dog LOAEL = 25 mg/kg/day (male/female) based on: decreased body weight gains, hematological and clinical chemistry alternations, liver toxicity and voluntary muscle pathological changes.
Short-Term Dermal	Oral NOAEL = 10.0	MOE = 100	Developmental toxicity Study - rats Maternal LOAEL = 40 mg/kg/day based on decreased body weight gain and food consumption (most significant on days 7-10 of dosing). This dose/endpoint/study was used for deriving the aRfD. Dermal toxicity study is not available. 100% dermal absorption factor should be used for this risk assessment.

Table 3. Summary of Toxicological Dose and Endpoints for Dichlormid Use in Human Risk Assessment[1].			
Exposure Scenario (Fipronil)	**Dose Used in Risk Assessment, UF**	**FQPA SF and Endpoint for Risk Assessment**	**Study and Toxicological Effects**
Intermediate- and Long-Term (Dermal)	Oral NOAEL = 6.5	MOE = 100	2-year study - rat LOAEL = 32.8 mg/kg/day (♂) based on liver clinical pathology/histopathology and increased liver weight. This dose/endpoint/study was used for deriving the cRfD. 100% dermal absorption factor should be used for this risk assessment.
Inhalation (All Durations)	2 µg/L		14-week inhalation study LOAEL = 19.9 µg/L based on clinical signs, increased liver and kidney weights, gross pathology and non-neoplastic histopathology. The route of exposure in this study is appropriate for this risk assessment.
Cancer	NOAEL = 6.5	LOAEL = 32.8 mg/kg/day based on decreased BWG, decreased FE, increased liver weight, and liver histopath. No evidence of carcinogenicity.	Feeding/ Carcinogenicity Study in rats

[1] UF = uncertainty factor, FQPA SF = FQPA Safety Factor, NOAEL = no observed adverse effect level, LOAEL = lowest observed adverse effect level, PAD = population adjusted dose (a = acute, c = chronic) RfD = reference dose, LOC = level of concern, MOE = margin of exposure.

Acute Dietary Endpoint: The aRfD is established at 0.10 mg/kg/day based on the maternal toxicity no-observed-adverse-effect-level (NOAEL) of 10 mg/kg/day from the developmental toxicity study in the rat (MRID# 44606408) and an uncertainty factor (UF) of 100 (10x interspecies extrapolation, 10x intraspecies variation). The NOAEL of 10 mg/kg/day was based on decreased body weight gains and food consumption (most significant on days 7-10 of dosing) seen at the maternal toxicity lowest observed adverse effect level (LOAEL) of 40 mg/kg/day.

$$aRfD = \frac{NOAEL}{UF} = \frac{10\ mg/kg/day}{100} = 0.10\ mg/kg/day$$

The FQPA SFC determined that the SF of 10x is applicable for this acute dietary risk assessment. Thus, the aPAD for the general U.S. population (including infants and children) is equivalent to the acute RfD/10, 0.010 mg/kg.

$$aPAD = \frac{aRfD}{(FQPA\ SF)} = \frac{0.10\ mg/kg/day}{10} = 0.010\ mg/kg/day$$

Chronic Dietary Endpoint:

TRB assigned a cRfD for dichlormid of 0.017 mg/kg/day using a NOAEL of 5 mg/kg/day (100 ppm) established from a chronic toxicity study in dogs and an UF of 300 (10x interspecies extrapolation, 10x intraspecies variation, 3x UF from previous assessment). The LOAEL of 25 mg/kg/day is based on decreased body weight gains, hematological and clinical chemistry alternations, liver toxicity and voluntary muscle pathological changes.

$$cRfD = \frac{NOAEL}{UF} = \frac{5\ mg/kg/day}{300} = 0.017\ mg/kg/day$$

The FQPA SFC determined that the SF of 10x is applicable for this chronic dietary risk assessment. Thus, the cPAD for the general U.S. population (including infants and children) is equivalent to the chronic RfD/10, 0.005 mg/kg.

$$cPAD = \frac{aRfD}{(FQPA\ SF)} = \frac{0.017\ mg/kg/day}{10} = 0.0017\ mg/kg/day$$

Carcinogenicity: Dichlormid has not been classified by the HIARC or HED CARC in terms of potential for carcinogenicity. However, there is no evidence of a positive carcinogenic effect in the rat and mouse carcinogenicity studies based on evaluation of the studies.

Short-Term Dermal Toxicity: In the developmental toxicity study in rats, the HIARC selected the maternal toxicity NOAEL of 10 mg/kg/day based on decreased body weight gain and food consumption at the LOAEL of 40 mg/kg/day in the rat developmental toxicity study for the short-term dermal toxicity dose/endpoint. This dose was also selected for the aRfD. The duration of the short-term dermal scenarios for dichlormid are comparable to the duration of exposure in the rat developmental toxicity study. There were no appropriate dermal toxicity studies available. Since an oral NOAEL was selected, a dermal absorption factor should be used for this risk assessment. Therefore, a default factor of 100% was used in the absence of data to provide a better estimate. This risk assessment is required.

Intermediate- and Long-Term Dermal Toxicity: The HIARC identified the same dose and endpoint for intermediate- and long-term dermal exposure. The HIARC selected the 2-year chronic toxicity/carcinogenicity rat feeding study with a NOAEL of 6.5 mg/kg/day (100 ppm) and a LOAEL of 32.8 mg/kg/day (500 ppm), based on an increased incidence of liver clinical pathology/histopathology and increased liver weight in the 2-year study in rats (MRID No.

44529402). This study/dose were also selected for the cRfD. Since an oral NOAEL was selected, a dermal absorption factor should be used for this risk assessment. Therefore, a default factor of 100% was used in the absence of data to provide a better estimate. This risk assessment is required.

Dermal Penetration: The dermal absorption factor is 100%.

Inhalation (All Durations): The HIARC selected an inhalation NOAEL of 2 µg/L based on clinical signs, increased liver and kidney weight, gross pathology findings and non-neoplastic histopathology at the LOAEL of 19.9 µg/L (14-week inhalation study). This risk assessment is required.

MOE for Occupational/Residential Assessments: The HIARC determined that a MOE of 100 is adequate for occupational exposure risk assessment (HED Doc. No. 013604, J. Rowland and Brenda Tarplee, 8/5/99). A MOE of 1000 (including the10x FQPA SF) would be adequate for residential exposure.

4.0. EXPOSURE ASSESSMENT

4.1. Summary of Directions for Use

Table 4. Summary of Directions for Use of Dichlormid

Formulation [EPA Reg. No.]	Applic. Timing, Type, and Equip.	Applic. Rate (lb ai/A)	Max. No. Applic. per Season	Max. Seasonal Applic. Rate (lb ai/A)	PHI (days)	Use Directions and Limitations
Field Corn, Pop Corn, Sweet Corn and RACs						
Surpass™ EC [62719-367] **Emulsifiable Concentrate**	Pre-Plant or pre-emergence Post-emergence up to 11"high Broadcast Ground Equipment	0.216-0.54	1 - 2	0.54	Within 30 days of planting: early pre-plant within 14 days of planting: pre-plant	Do not apply to following soils if ground water is below 30ft.: sand with <3% organic, loamy sand with <2% organic, sandy loam with<1% organic. Do not apply through irritation or aerial.

Keystone™ [62719-368] **Suspo-Emulsion**	Pre-Plant or pre-emergence Post-emergence up to 11"high Broadcast Ground Equipment	0.275-0.43	1 - 2	0.43	Within 30 days of planting: early pre-plant within 14 days of planting: pre-plant	Do not apply to following soils if ground water is below 30ft.: sand with <3% organic, loamy sand with <2% organic, sandy loam with<1% organic. Do not apply through irritation or aerial.
TopNotch™ [62719-369] **Micro-Emulsion**	Pre-Plant or pre-emergence Broadcast Ground Equipment	0.26 -0.43	1 - 2	0.43	Within 40 days of planting: early pre-plant within 14 days of planting: pre-plant	Do not apply to following soils if ground water is below 30ft.: sand with <3% organic, loamy sand with <2% organic, sandy loam with<1% organic. Do not apply through irritation or aerial.
Surpass™ 20G [62719-370] **Granular**	Pre-Plant or pre-emergence Broadcast Ground Equipment	0.3-0.52	1 - 2	0.52	Within 30 days of planting: early pre-plant within 14 days of planting	Do not apply to following soils if ground water is below 30ft.: sand with <3% organic, loamy sand with <2% organic, sandy loam with<1% organic. Do not apply through irritation or aerial.
FulTime™ [62719-371] **Micro-Encapsulate**	Pre-Plant or pre-emergence Post-emergence up to 11"high Broadcast Ground Equipment	0.25-0.51	1 - 2	0.51	Within 40 days of planting: early pre-plant within 14 days of planting: pre-plant	Do not apply to following soils if ground water is below 30ft.: sand with <3% organic, loamy sand with <2% organic, sandy loam with<1% organic. Do not apply through irritation or aerial.
Surpass™ 7E [62719-372] **Soluble Concentrate**	Pre-Plant or pre-emergence Post-emergence up to 11"high Broadcast Ground Equipment	0.25-0.43	1 - 2	0.43	Within 30 days of planting: early pre-plant within 14 days of planting: pre-plant	Do not apply to following soils if ground water is below 30ft.: sand with <3% organic, loamy sand with <2% organic, sandy loam with<1% organic. Do not apply through irritation or aerial.

Keystone™ LA [62719-479] Suspo-Emulsion	Pre-Plant or pre-emergence Post-emergence up to 11"high Broadcast Ground Equipment	0.20-0.49	1 - 2	0.49	Within 30 days of planting: early pre-plant within 14 days of planting: pre-plant	Do not apply to following soils if ground water is below 30ft.: sand with <3% organic, loamy sand with <2% organic, sandy loam with<1% organic. Do not apply through irritation or aerial.

The proposed use directions are adequate.

4.2. Dietary Exposure

4.2.1. Food Exposure

Residue chemistry data pertaining to the proposed use of dichlormid on corn were submitted and reviewed by TRB (DP Barcode: D3318075 & D357398, D. Rate, 9/14/2005).

4.2.1.a. Nature of the Residue - Plants and Livestock

Plants

MRID 46015801, D. Rate, 09/13/04.

A plant metabolism study was conducted using the herbicide safener dichlormid (N,N-diallyl-2,2-dichloroacetamide, 99.8% a.i., [14C]-labeled at the carbonyl carbon). Dichlormid, applied either pre-emergence (on soil) or post-emergence (foliarly) to corn at 10X the maximum agricultural use rate (5.60 kg a.i./ha), yielded sufficient TRRs in corn matrices (0.027-0.272 mg/kg) for analysis of residues by solvent extraction and TLC. Extractability of TRR was substantial for young forage (63.0%) and stover (53.1-53.8%) but was poor for grain and cobs (6.8-7.8%), and the latter were not further characterized. Identified components in young forage were dichlormid and the metabolites N,N-diallyl glycolamide and dichloroacetic acid (4.2%, 4.9%, and 2.5% TRR, respectively), but the rest of the TRR, including metabolite A (15.0% TRR; 0.16 mg/kg), was not identified. The stover contained dichloroacetic acid (5.3-5.9% TRR) and unknown metabolite A (14.0-16.6% TRR) and post-emergence stover also had low levels of dichlormid and N,N-diallyl glycolamide (0.9-1.2% TRR). Enzyme and acid hydrolysis of stover unextractable debris released residues that were not identified. The results indicate that dichlormid metabolism is qualitatively similar in all corn matrices and involves two routes: a de-chlorination followed by oxidation to form N,N-diallyl glycolamide, and loss of an allyl group followed by oxidation to form dichloroacetic acid.

The residue(s) of concern in corn for dichlormid were not defined with certainty in this study. The identified residues represent a small fraction (<12%) of the TRR in each matrix, and a metabolite (unknown A) that represented >10% TRR in stover and young forage was not identified. The relatively low residue levels in the 10X samples may have contributed to the low

percent identification of residues in the various corn matrices. It is possible that the identified residues, which each represented ≤0.010 mg/kg at the 10X treatment rate (unknown A was ≤0.045 mg/kg), would not be detected in plants treated at the 1X treatment rate.

The plant metabolism data are classified as scientifically Unacceptable/Guideline and does not satisfy OPPTS 860.1300. However, the study may be upgraded if additional metabolites are identified, including unknown A, to allow a more complete characterization of the nature of the residue of dichlormid in corn.

It is notable that the corn matrices had low TRR (≤0.27 mg/kg), as did the individual components (≤0.010 mg/kg for identified residues; ≤0.045 mg/kg for unknown A) at the 10X treatment rate, and these may not be detectable at the 1X treatment rate. The study is acceptable for the purpose of extending time-limited tolerances.

Livestock

MRID 46015802, D. Rate, 09/13/04.
MRID 46015803, D. Rate, 09/13/04.

Lactating Goat:

In a goat metabolism study, the herbicide safener dichlormid (N,N-diallyl-2,2-dichloroacetamide, 99.8% a.i., [14C]-labeled at the carbonyl carbon) (14.36-14.88 mg/day; 11.59 - 13.89 ppm) was given to one goat by gavage once/day for 5 days. The majority of each dose was excreted within 24 hours of administration; the total excreted radioactivity 23 hours after the last dose accounted for ~82% of the administered dose. The milk, liver, kidneys, and muscle each contained <1% of the administered radioactivity, the majority of which was solubilized by solvent extraction and enzyme hydrolysis. Only 0.6- 22.7% of the radioactive residues present in any given matrix were identified by HPLC, precluding a complete characterization of the nature of the residues, or residues of concern, of dichlormid in goat milk and tissues.

Dichlormid may be extensively metabolized in goats, as dichlormid parent was found in only a few samples (32 hour milk and liver PES supernatants), where it represented a lower % TRR (0.2-8.5%) than other components. Its metabolic pathway was not well-defined since only a small fraction (0.6-22.7%) of the TRR was identified in each matrix. Dichlormid metabolism is proposed to involve N-dealkylation and dechlorination followed by oxidation, since the metabolites N-allyl-2,2-dichloro-acetamide and N,N-diallyl glycolamide were found in almost all matrices (the latter was not found in muscle, which had TRR of only 0.056 ppm). It is unknown if the metabolic pathway was the same in all tissues because >77% of the TRR was not identified.

This goat metabolism study (MRID 46015802) did not provide sufficient information to establish the residues of concern for dichlormid in goat milk and tissues. This is because only a small fraction (0.6-22.7%) of the TRR was identified in each matrix, and these identities were not confirmed by a second analytical method (as required by OPPTS 860.1300 guidelines). Total

residue levels in the evaluated tissues and milk were low (<0.001 - 0.064 ppm), which likely contributed to the inability to identify some unknowns, although the parent and metabolites R 326590 and R 305588 were identified at similarly low levels (<0.001- 0.040 ppm).

The livestock metabolism data are classified as scientifically Unacceptable/Guideline for a metabolism study in ruminants (OPPTS 860.1300) because it did not adequately define the nature of the residues or the residue(s) of concern for dichlormid, and 84.4% is an inadequate animal mass balance accounting. It may be upgraded upon further identification of residues representing ≥ 10% TRR and/or 0.05 ppm, and an adequate explanation of the poor mass balance accounting. The study is acceptable for the purpose of extending time-limited tolerances.

Laying Hen:

In a hen metabolism study, the herbicide safener dichlormid (N,N-diallyl-2,2-dichloroacetamide, 99.8% a.i., [14C]-labeled at the carbonyl carbon)(1.75 mg/day; 10 ppm) was given to 5 laying hens by gavage once/day for 14 days. Within 24 hours of administration, the majority of each dose was excreted and a steady state was achieved for excreted residues. Residues accumulated somewhat in egg whites and yolks, which attained steady state residue levels after 3 and 8 days, respectively. After 14 days, 96.91% of the TRR was accounted for, being found in the excreta (94.38% TRR), cage washes (1.14% TRR), egg yolks and whites, liver, breast and thigh muscle, fat, and skin with (latter each <1% of the administered radioactivity). Limited identification of residues was achieved for each matrix using two HPLC methods, varying from 0% TRR (fat) to 15.4% TRR (day 13 egg whites). This precluded a complete characterization of the nature of the residues, or residues of concern, of dichlormid in hen eggs and tissues. The residue identities were not confirmed by a second analytical method, as suggested by OPPTS 860.1300 guidelines, although an unsuccessful attempt was made to use LC-MS with several tissues. The parent dichlormid and/or metabolites R326590 and R305588 were identified at low levels (<0.001-0.077 ppm) in all matrices except fat, and could possibly be used to regulate dichlormid residue levels for tolerance purposes.

The finding of very little parent dichlormid in tissues (≤1% tissue TRR), at levels lower than of other identified and/or unknown components, indicates that it is extensively metabolized. The presence of metabolite R326590 (N-allyl-2,2-dichloro-acetamide) and R305588 (N,N-diallyl glycolamide) in most matrices, and of R336075 (N,N-diallyloxamic acid) and R327940 (N,N-diallylglyoxylamide) in egg yolks and thigh muscle, respectively, indicates that dichlormid metabolism involves N-dealkylation and dechlorination coupled with various degrees of oxidation. Because only a small fraction (≤15.4%) of the TRR was identified in each matrix, however, the dichlormid metabolic pathway and similarities among tissues cannot be defined with certainty.

This metabolism study is classified Unacceptable/Guideline for a metabolism study in laying hens (OPPTS 860.1300) because it did not adequately define the nature of the residues or the residue(s) of concern for dichlormid (0-15.4% TRR was identified in each matrix). It is upgradeable upon further identification of residues representing ≥10% TRR and/or 0.05 ppm. It may be possible to use levels of dichlormid, R326590, and/or R305588 to regulate residue levels

in hen tissues for tolerance purposes, since one or more of these was found in all examined matrices except fat. The study is acceptable for the purpose of extending time-limited tolerances.

4.2.1.b. Residue Analytical Method - Plants and Livestock

PP#:6F3344, DP Barcode: D248305, S. Chun, 09/21/99.

An enforcement method has been submitted for the determination of residues of dichlormid in field corn, grain, fodder, and forage. A petition method validation (PMV) was successfully completed with minor revisions recommended by the Analytical Chemistry Branch (ACB) (PP#: 6F03344, DP Barcode: D199320, G. Kramer, 08/29/94). The registrant was requested to submit standards of dichlormid to the EPA repository and submit a revised version of the proposed analytical enforcement method. The Agency received a pure active ingredient (PAI) standard (dichlormid) for the EPA Repository from the registrant in August of 2003. **Until the receipt of the revised method, the requirements for analytical enforcement methodology will remain unfulfilled.** However, for the purposes of extending the time-limited tolerance, the method is adequate.

4.2.1.c. Multiresidue Methods

PP#:6F3344, DP Barcode: D248305, S. Chun, 09/21/99.

A report on multiresidue testing of dichlormid was received and forwarded to FDA (PP#: 6F03344, DP Barcode: D191195, G. Kramer, 9/16/93). Dichlormid was evaluated using multiresidue method Protocols C, D and E. Protocol C demonstrated dichlormid to be amenable to detection by electron capture, nitrogen/phosphorous and electrolytic conductivity detectors. The recovery from lettuce samples fortified at 0.1 ppm was 79.2% with Protocol D and 41.4% with Protocol E. The recovery from soybean samples fortified at 0.1 ppm was 38.3% with Protocol E.

4.2.1.d. Storage Stability Data

PP#:6F3344, DP Barcode: D248305, S. Chun, 09/21/99.

Storage stability data were submitted for dichlormid in field corn ears (Accession# 005802). Twenty-five gram samples were fortified with 0.10 ppm of dichlormid. Samples were kept frozen at approximately -20°C ± 10°C for up to three years. Periodic analyses of the samples were completed to determine if dichlormid deteriorated with time during frozen storage. Samples were analyzed at day 0 and after storage for 3, 8, 12, 24, and 36 months. At the 24 and 36 month intervals, newly fortified control samples were also analyzed to verify the accuracy of the analytical procedure. At each interval, 2 fortified samples and 1 unfortified sample were analyzed.

The samples were analyzed for dichlormid using analytical method RRC-83-64, "Determination of Residues of Cycloate, R29148, and R25788 in Corn Fodder and Corn Grain by Gas Chromatography". The results of this study are presented in Table 5.

Table 5. Percent recovery of Dichlormid in Corn Ears at Different Time Intervals

Time Interval (days)	Corrected % Recovery [a]
0	93
96	101
240	86
360	99
751	95
1095	73

[a] Each value is the average of 2 individual determinations.

No dichlormid residues, < 0.05 ppm (LOQ), were detected in the control samples.

The study does not specify what different corn RACs were analyzed and uses the term "corn ears." The study does include storage stability data of dichlormid in wheat grain and straw. These data can be translated to corn RACs. Wheat samples were stored at intervals of 270, 818, and 1240 days. The wheat data are presented in Table 6.

Table 6. Percent Recovery of Dichlormid in Wheat RACs at Different Time Intervals

RAC	Time Interval (days)	Corrected % Recovery [a]
Wheat Grain	0	93
	270	88
	818	96
	1240	100
Wheat Straw	0	93
	270	96
	818	96
	1240	87

[a] Each value is the average of 2 individual determinations.

The storage stability data are acceptable. The data shows dichlormid to be stable in corn and wheat for up to 3 years when stored frozen. HED concluded that storage stability had been demonstrated for the purposes of time-limited tolerances for dichlormid. If other residues are found to be of regulatory interest, storage stability studies for those residues will be required, as well.

4.2.1.e. Crop Field Trials

PP#:6F3344, DP Barcode: D248305, S. Chun, 09/21/99.
MRID 46353807, D. Rate, 08/25/05.

Corn field trial data were previously submitted and reviewed in support of the post-emergent use (PP#: 5F4505, DP Barcode: D214735, G. Herndon, 06/25/96) of acetochlor. A formulation, designated Acetochlor EC Herbicide, was used in the field trials. Eight field trials were conducted during the 1993 growing season in IA (Region 5), IL (Region 5), IN (Region 5), MN (Region 5), NE (Region 5), OH (Region 5), TX (Region 8), and WI (Region 5), 1 trial per state. Each treated plot received one post-emergence application of emulsifiable concentrate (EC) formulation when the corn plants had reached a height of 5-9" at an application rate of 3.0 lbs. acetochlor/A. The application rate of dichlormid was 0.5 lb. dichlormid/A. Table 7 summarizes this data. All field trials had residues below the LOQ (0.01 ppm).

Table 7. Summary of Residue Data From Previous Crop Field Trials with Dichlormid

Crop Matrix	Total Applic. [Target] Rate[1] (lb a.i./A)	PHI (Days)	Residue Levels (ppm)						
			n[2]	Min	Max.	HAFT*	Median (STMdR)	Mean (STMdr) Std. Dev.	Std. Dev.
Dichlormid									
Forage	0.5	12-31	8	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0
Grain	0.5	104-131	8	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0
Stover	0.5	104-131	19	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0

[1] This is the rate of application of dichlormid itself.
[2] Includes duplicate analysis of some samples.
* HAFT = Highest Average Field Trial.

The reviewed field trials were submitted prior to the current OPPTS Test Guidelines, Series 860. HED concluded that assuming residues are less than the LOQ, a total of 15 field trials should be conducted on field corn and analyzed for dichlormid in accordance with OPPTS Test Guideline 860.1500.

In response to the previous HED review, Pyxant Labs Inc. has submitted field trial data for dichlormid on field corn. Eight additional trials were conducted encompassing EPA Regions 1 (1, PA), 2 (1, VA), 5 (5, IA, IL, IN, OH, WI), and 6 (1, TX) during the 2002 growing season. The

number and locations of field trials were chosen in order to satisfy an EPA request for an additional eight magnitude of residue trials to be conducted in EPA regions 1, 2, 5 and 6.

At each test location, treatment consisted of a single foliar application to field corn when it was 9-12 inches tall of dichlormid at the target rate of 0.48 lb a.i./A (0.54 kg a.i./ha). This mixture resulted from dissolving the GF-670 Capsule Suspension formulation of TopNotch Herbicide in water. An adjuvant was not added to the spray mixture in any applications. Forage, grain, and stover were harvested at pre-harvest intervals (PHIs) of 62-77, 102-135, and 102-135 days, respectively. Table 8 summarizes this data.

Table 8. Summary of Residue Data From Crop Field Trials with Dichlormid

Crop Matrix	Total Applic. [Target] Rate[1] (lb a.i./A)	PHI (Days)	Residue Levels (ppm)						
			n[2]	Min	Max.	HAFT*	Median (STMdR)	Mean (STMdr) Std. Dev.	Std. Dev.
Dichlormid									
Forage	0.48	62-77	19	< 0.003	< 0.0046	< 0.003	< 0.003	< 0.003	0
Grain	0.48	102-135	20	< 0.003	< 0.033	< 0.003	< 0.003	< 0.003	0
Stover	0.48	102-135	19	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	0

[1] This is the rate of application of dichlormid itself.
[2] Includes duplicate analysis of some samples.
* HAFT = Highest Average Field Trial.

Residues of dichlormid were quantified using Zeneca Agrochemical's analytical method RAM-244/02, which uses gas chromatography with nitrogen phosphorous detection (GC/NPD). Satisfactory method performance in detecting residues was demonstrated by concurrent recoveries. The results from these trials show that maximum residues in forage, grain, and stover never exceeded the method's LOQ, which is 0.01 ppm. The petitioner stated that a freezer storage study is in progress showing that dichlormid is stable for up to four months in all three matrices. Storage stability of dichlormid is adequate as shown in previously submitted data (PP#:6F3344, DP Barcode: D248305, S. Chun, 09/21/99). There was no residue decline study.

Though the submitted field trial data report residue levels <0.01 ppm, the enforcement method's LOQ is 0.05 ppm. Therefore, the appropriate tolerance level is 0.05 ppm for all corn RACs. If other residues are found to be of regulatory interest, additional field trials will be required.

The submitted studies reflect the use patterns for dichlormid, and the storage stability studies support the residue data. The enforcement methods are adequate for detecting the parent compound, dichlormid. However, because the metabolism studies were not adequate to determine residues present at levels >10% TRR, residues of concern in addition to the parent compound have not been identified. Based on the previously submitted data on corn, TRB can only recommend for an extension to the current time-limited tolerances of 0.05 ppm for the use of dichlormid on field corn (forage, grain, stover), sweet corn (K+CWHR, forage and stover) and pop corn (grain, stover).

4.2.1.f. Processed Food/Feed

No processing studies are required for field corn.

4.2.1.g. Water, Fish, and Irrigated Crops

Dichlormid is presently not registered, nor is the registrant seeking registration for direct use on water and aquatic food and feed crops; therefore, no residue chemistry data are required under these guideline topics.

4.2.1.h. Food Handling

Dichlormid is presently not registered, nor is the registrant seeking registration for use in food-handling establishments; therefore, no residue chemistry data are required under these guideline topics.

4.2.1.i. Meat, Milk, Poultry and Eggs

MRID 46015802, D. Rate, 09/13/04.
PP# 3E6676, DP Barcode: D294741, D. Rate, 09/14/04

Currently, there are no registered direct animal treatments of dichlormid to livestock. However, dichlormid has time-limited tolerances for use on field corn, popcorn, silage corn and production seed corn, with a request for the addition of sweet corn, which contains animal feedstuffs. Based on the submitted study on lactating goats, the dichlormid residues found in animal tissues were between <0.001 - 0.023 ppm when treated at a level ~200X the proposed tolerance level. TRB does not expect quantifiable residues in animal commodities when fed corn treated by the proposed use of dichlormid, therefore dichlormid tolerances are not required on animal commodities.

4.2.1.j. Confined Accumulation in Rotational Crops

MRID 46353807, D. Rate 08/25/05.

In a confined rotational crop study, sandy loam soil was sprayed with the herbicide safener dichlormid (N,N-diallyl-2,2-dichloroacetamide, 99.8% a.i., [14C]-labeled at the carbonyl carbon) prepared as an emulsifiable concentrate with the herbicide acetochlor. The single application was at the maximum seasonal application rate (1X) of 0.56 kg a.i./ha (0.5 lb/acre). At 30, 120, and 365 days after application (DAA), spring wheat, carrot, and soybean seeds were planted in the treated soil.

Samples were initially extracted with acetonitrile (ACN), ACN:water, and water, and soybean grain also with hexane, and the extracts characterized by HPLC. The polar extracts were subjected to solid phase extraction (SPE) and ACN extracts to acid hydrolysis at 95°C, followed by HPLC. Post-extraction solids (PES) were extracted with acid, some were partitioned with

dichloromethane, and supernatants analyzed by HPLC. The remaining insolubles were resuspended and the radioactive residues shown to be incorporated into plant cell wall polysaccharides, starch, monosaccharides, proteins, and lignin by driselase, pullulanase and amylglucosidase digestion, trichloroacetic acid precipitation, and base hydrolysis, respectively. The storage stability study of wheat hay and early forage, and soybean early forage (55-63 weeks at -20°C) indicated that dichlormid and its metabolites are stable frozen at -20°C for a year. Residues in soil were not evaluated, although a natural water sample from an environmental fate study with [14C]-dichlormid was analyzed by HPLC.

Total radioactive residues (TRR) at the 30, 120, and 365 DAA wheat samples were: 0.005-0.169 ppm in early forage, 0.017-0.639 ppm in hay, 0.014-0.629 ppm in straw, and 0.017-0.295 ppm in grain. TRR in carrot shoots were 0.005-0.115 ppm and in 30 DAA roots were 0.038 ppm. TRR in soybean samples were: 0.005-0.122 ppm in early forage, 0.014-0.331 ppm in hay, 0.010-0.139 ppm in straw, and 0.019-0.039 ppm in grain. In every matrix, maximum residues occurred at 30 DAA, and TRR levels decreased as the DAA increased. TRR recoveries of extracts were acceptable for all matrices. Radioactive residues were also found in control matrices, which was likely due to incorporation of 14CO2 released from dichlormid in the soil.

Dichlormid was extensively metabolized, as the parent was found in only wheat early forage and hay at low levels (0.01 ppm). Based on their partitioning behavior, most of the known and unknown metabolites from all three crops were polar. Wheat forage, hay, and/or straw metabolites included N,N-diallyl-2-hydroxyacetamide, N,N-di-2-propenylacetamide, N,N-diallyl glyoxylamide, 2-chloro-N,N-di-2-propenylacetamide, N-allyl-2,2-dichloroacetamide, N-allyl-2,2-glyoxylamide, and dichloroacetic acid (each 0.001-0.024 ppm, 0.3-3.7% TRR). Residues were also present in wheat hay and straw cell wall polysaccharides and lignin, and in starch and cell walls in grain. The 120 DAA carrot shoots contained N,N-di-2-propenylacetamide (0.001 ppm, 6.3% TRR) and radiolabeled glucose (0.001 ppm, 2.0% TRR) was detected in 30 DAA roots. Identified metabolites in 30 and/or 120 DAA soybean early forage, hay, and/or straw included N,N-diallyl glyoxylamide, N,N-diallyl-2-hydroxyacetamide, N-allyl-2,2-dichloroacetamide, and 2-chloro-N,N-di-2 -propenylacetamide (each 0.001-0.013 ppm, 0.9-3.9% TRR). No dichlormid-related metabolites were identified in soybean grain. The environmental fate study water sample contained N,N-di-2-propenylacetamide, 2-chloro-N,N-di-2-propenylacetamide, and N,N-diallyl-2-hydroxyacetamide (59.7, 33.0 and 7.2% of the applied sample radioactivity, respectively).

Dichlormid metabolism in all rotational crops is proposed to involve two routes. In one, dichlormid is first de-chlorinated to form 2-chloro-N,N-di-2-propenylacetamide and N,N-di-2-propenylacetamide, and in the other, dichlormid first loses an allyl group to form N-allyl-2,2-dichloroacetamide. The final product of both routes is CO2, which can be re-assimilated into endogenous plant cell components. This study did not establish the residues of concern for dichlormid because 12.8% of the TRR was identified in each matrix, although the low levels of metabolites and the similarities in proposed metabolic pathway with a primary crop (corn, MRID 46015801) suggest that no new metabolites will be present at levels of concern in the rotational crops.

Based on this confined rotational crop study, the label crop rotation restriction interval for all crops is one year, because residues > 0.01 ppm were found at 30 DAA and 120 DAA in all three rotational crops.

4.2.1.k. Field Accumulation in Rotational Crops

No studies in field accumulation in rotational crops have been submitted. **The registrant should submit a field accumulation in rotational crop study in accordance with OPPTS Guideline, 860.1900.**

4.2.1.l. Proposed Tolerances

Tolerance expressions are set in terms of the parent compound only. Because no other data exists on the associated metabolites, the recommended time-limited tolerance is based only on the parent compound. Once additional data is submitted and reviewed, a complete tolerance expression can be established for the herbicide safener, dichlormid.

4.2.1.m. International Harmonization of Tolerances

Currently there are no international harmonization issues associated with the use of dichlormid on corn.

4.2.2. Dietary Exposure and Risk Analyses

HED conducts dietary (food only) risk assessments using DEEM™, which incorporates consumption data generated in USDA's Continuing Surveys of Food Intakes by Individuals (CSFII), 1989-1992. For acute dietary risk assessments, one-day consumption data are summed and a food consumption distribution is calculated for each population subgroup of interest. The consumption distribution can be multiplied by a residue point estimate for a deterministic exposure/risk assessment, or be used with a residue distribution in a probabilistic type risk assessment. Acute exposure estimates are expressed in mg/kg bw/day and as a percent of the aPAD. For chronic risk assessments, residue estimates for foods or food-forms of interest are multiplied by the average consumption estimate of each food/food-form of each population subgroup. Chronic exposure estimates are expressed in mg/kg bw/day and as a percent of the cPAD.

4.2.2.a. Acute Dietary Exposure Analysis

A Tier 1 acute dietary risk assessment was performed assuming tolerance level residues, default processing factors for all commodities and 100% CT. For acute dietary risk, HED's level of concern is >100% aPAD. For acute dietary risk, HED's level of concern is >100% aPAD. Dietary exposure estimates for the U.S. population and other representative subgroups are presented in Table 9.

Table 9. Summary of Results from Acute DEEM™ Analysis at 95th Percentile.		
Subgroups [1]	**Exposure (mg/kg/day)**	**% aPAD**
U.S. Population	0.000336	3.4
All infants (<1 year old)	0.000752	7.5
Children (1-2 years old)	0.000597	6.0
Children (3-5 years old)	0.000611	6.1
Children (6-12 years old)	0.000464	4.6
Youth (13-19 years old)	0.000381	3.8
Adults 20-49 years old.	0.000245	2.5
Females (13-49 years old)	0.000257	2.6
Adults (50+ years old)	0.000148	1.5

[1] HED notes that there is a degree of uncertainty in extrapolating exposures for certain population subgroups which may not be sufficiently represented in the consumption surveys, (e.g., non-nursing infants, etc.). Therefore, risks estimated for these subpopulations were included in representative populations having sufficient numbers of survey respondents (e.g., all infants, females, 13-50 years, etc.).

The results of the acute analysis indicate that the estimated acute dietary risk associated with the recommended uses of dichlormid is below HED's level of concern (<100% aPAD).

4.2.2.b. Chronic Dietary Exposure Analysis

A chronic dietary analysis was performed assuming tolerance level residues, default processing factors for all commodities and 100% CT. For chronic dietary risk, HED's level of concern is >100% cPAD. Dietary exposure estimates for the U.S. population and other representative subgroups are presented in Table 10.

Table 10. Summary of Results from Chronic DEEM™ Analysis.		
Subgroups [1]	**Exposure (mg/kg/day)**	**% cPAD**
U.S. Population	0.000104	6.1
All infants (<1 year old)	0.000138	8.1
Children (1-2 years old)	0.000213	13
Children (3-5 years old)	0.000246	15
Children (6-12 years old)	0.000188	11
Youth (13-19 years old)	0.000142	8.4
Adults (20-49 years old)	0.000085	5.0
Females (13-50 years old)	0.000085	5.0
Adults (50+ years old)	0.000049	2.9

[1] HED notes that there is a degree of uncertainty in extrapolating exposures for certain population subgroups which may not be sufficiently represented in the consumption surveys, (e.g., non-nursing infants, etc.). Therefore, risks estimated for these subpopulations were included in representative populations having sufficient numbers of survey respondents (e.g., all infants, females, 13-50 years, etc.).

The results of the chronic analysis indicate that the estimated chronic dietary risk associated with the recommended uses of dichlormid is below HED's level of concern (<100% cPAD).

4.2.2.c. Cancer Dietary Exposure Analysis

Dichlormid has not been classified by the HIARC or HED CARC in terms of potential for carcinogenicity. Therefore, no cancer dietary exposure analysis was completed with this action.

4.2.3. Drinking Water

A DWLOC is a theoretical upper limit on a pesticide's concentration in drinking water in light of total aggregate exposure to a pesticide in food, drinking water, and through residential uses. A DWLOC will vary depending on the toxic endpoint, with drinking water consumption, and body weights. Different populations will have different DWLOCs.

HED uses DWLOCs internally in the risk assessment process as a surrogate measure of potential exposure associated with pesticide exposure through drinking water. In the absence of monitoring data for pesticides, it is used as a point of comparison against conservative model estimates of a pesticide's concentration in water.

DWLOC values are not regulatory standards for drinking water. They do have an indirect regulatory impact through aggregate exposure and risk assessments.

HED does not have monitoring data available to perform a quantitative drinking water risk assessment for dichlormid at this time. EFED provided ground and surface water exposure estimates for the use of dichlormid on corn (DP Barcode: D258095, A. Clem, 8/3/99).

4.2.3.a. Surface and Ground Water

Dichlormid is relatively short-lived in aerobic soil (aerobic soil "half-life" measured in one soil of approximately 7-12 days). Carbon dioxide was the only major identified aerobic soil metabolite. Its evolution from the centrally labeled carbonyl position indicates a high degree of mineralization of the dichlormid molecule. Other unidentified volatiles totaled less than approximately 3%. Minor amounts of several degradates extracted from the soil by organic solvents were not identified. Significant amounts of other soil degradates were resistant to harsher extraction and presumably remain as bound residues. Dichlormid was stable against hydrolysis and photolysis in soil and water.

Dichlormid's low sorptivity to soil (median K_d of 0.45 and median K_{oc} of 39 mL/g in four soils) indicates high mobility. Based on its low sorptivity to soil, high solubility in water (4.4 g/L), and low octanol to water partitioning ratio (K_{ow} = 69), bioconcentration is not anticipated.

Drinking water exposure estimates are based on degradation and transport factors for dichlormid coupled with EFED's current GENEEC (surface water) and SCI-GROW (groundwater)

screening models for surface and ground water, respectively. Model results are for an application rate of dichlormid of 0.5 a.i./A (DP Barcode: D258095, A. Clem, 8/3/99).

Tier 1 GENEEC estimated environmental concentrations (EEC) are summarized in Table 11.

Table 11. EECs for Dichlormid Use on Corn

GENEEC (µg/L) Parent and Degradate	Peak EEC	56-day EEC	56-day[1] EEC
Dichlormid	27.29	26.93	8.98

[1] HED interim policy allows the 56-day GENEEC value to be divided by 3 to obtain a value for chronic risk assessment calculations. The values in this column have been divided by 3.

Based on the SCI-GROW model, acute drinking water concentrations in shallow ground water on highly vulnerable sites are summarized in Table 12.

Table 12. Acute Groundwater EEC for Dichlormid Use on Corn

SCI-GROW	µg/L (ppb)
Dichlormid	0.046

Chronic concentrations are not expected to be higher than acute values (DP Barcode: D258095, A. Clem, 8/3/99).

4.2.3.b. Drinking Water Risk

HED's default body weights are: males - 70kg, females - 60kg, and children - 10 kg. Drinking water consumption defaults are: adults - 2 L, children - 1 L

$$DWLOC\ (\mu g/L) = \frac{water\ exposure\ (mg/kg/day)\ x\ (body\ weight)}{consumption\ (L)\ x\ 10^{-3}\ mg/\mu g}$$

DWLOCs were calculated for the U.S. general population and the children subgroup which had the highest dietary exposure. To calculate DWLOCs for acute (or chronic) exposure relative to an acute (or chronic) toxicity endpoint, the acute (or chronic) dietary food exposure (from the DEEM™ analysis) was subtracted from the aPAD (or cPAD) to obtain the acceptable acute (or chronic) exposure to dichlormid in drinking water.

The results for both the acute and chronic DWLOC calculations are presented in sections 5.1 and 5.3, respectively.

4.3. Occupational/Residential Exposure

4.3.1. Summary of Use Patterns and Formulations

Dichlormid, N,N-diallyl dichloroacetamide, is a herbicide safener used in pesticide formulations with the active ingredient, acetochlor, for the control of grass and broadleaf weeds. Products containing dichlormid are conditionally registered in the U.S. to Dow AgroSciences, LLC under the trade names Surpass® EC, Keystone®, TopNotch™, Surpass® 20G, FulTime™, Surpass® 7 E, and Keystone® LA. Currently, it is used in the treatment of corn (field, sweet and pop) raw agricultural comodities (RACs). Dichlormid is an emulsifiable concentrate that was prepared by blending dichlormid (98.0% purity X 12.04% of formulation) with acetochlor technical. The herbicide/safener formulations are typically applied as pre-emergence soil or early post-emergence foliar applications using broadcast ground equipment. The herbicide/safener may be applied both in the spring and fall, but the total applied must not exceed the maximum labeled rate for corn in that type of soil. The application must also be made within 14 days of planting when applied by conventional tillage systems and up to 40 days before planting in no-till systems. The application rate of dichlormid ranges from 0.30-0.54 lbs a.i./A.

Proposed Uses

There are many product formulations for dichlormid, each containing a different amount of dichlormid. The highest application rate from all the formulations is 0.54 lbs dichlormid/A (Surpass® 100).

Two products, Fultime™ and Surpass® 100, contain atrazine and acetochlor as active ingredients. The other four products, TopNotch™, Surpass® 7E, Surpass® 20-G, and Surpass® EC, contain only acetochlor as the active ingredient. All products specify use on field corn, production seed corn, silage corn, and popcorn. In all formulations, soil type and organic matter content determined the maximum application rate, with fine soil having the highest application rate. No aerial application is allowed. Application through sprinkler irrigation systems is prohibited. Tank mixing with other herbicides such as Atrazine, Bladex, 2,4-D, Accent, Beacon and Banvel is on the labels.

4.3.2. Occupational Exposure Assessment

HED has identified toxicological endpoints of concern for occupational exposure. Based on the use pattern, only short- and intermediate-term exposures are expected for workers applying dichlormid. Chemical specific data for dichlormid are not available. Therefore, handler exposures (mixer/loaders and applicators) have been assessed using surrogate data available in the Pesticide Handlers Exposure Database (PHED Ver 1.1, 1998) Surrogate Table. Table 15 summarizes the HED exposure estimates for workers mixing, loading, and applying dichlormid.

HED's level of concern for occupational exposures to dichlormid is for MOEs that are below 100. The aggregate (dermal and inhalation) MOEs for the groundboom applicator are **240** and **190** for short- and intermediate-term exposures, respectively. The aggregate MOEs for the

mixer/loader in support of groundboom applications are **150** and **120** for short- and intermediate-terms exposures, respectively. Therefore, all exposure estimates are below HED's level of concern.

Table 13. Handler Exposure and Risk from Proposed Uses of Dichlormid

Job Function-liquid formulations	Appl. Rate (lbs ai/Acre)	Unit Exposure (mg/lb ai)	Acres/ Day[2]	Dermal Average Daily Dose (ADD)[3] mg/kg/day	Inhalation ADD[3] mg/kg/day	Short-term MOE[4]	Interm-term MOE[4]	Total Short-term MOE[5]	Total Intermediate- term MOE[5]
Open System-Ground-mixer/loader	0.54	0.023 dermal	190	0.034	0.0018	300 dermal	190 dermal	150	120
		0.0012 inhalation				300 inhalation	300 inhalation		
Open Cab-Ground-applicator	0.54	0.014 dermal	190	0.021	0.0011	490 dermal	320 dermal	240	190
		0.00074 inhalation				480 inhalation	480 inhalation		

[1] Source: Pesticide Handlers Exposure Database (PHED) V1.1, Surrogate Exposure Table. All data is rated High Confidence with the exception of the dermal unit exposure for the ground applicator which is Medium Confidence.
[2] Assumptions regarding acreage treated/day from 1997 Agriculture Census. Average farm size is **190 acres** for the state with the largest acreage of corn (Iowa). Assumes that a commercial applicator can treat an entire farm in 1 day.
[3] ADD = Unit exposure(µg/lb ai) x AR x Acres/Day x 1/BW (70kg) x % Absorption (100%-inhalation and dermal)
[4] MOE = NOAEL/ADD; (where NOAEL = 10 mg/kg/day for short-term dermal; 6.5 mg/kg/day for intermediate-term dermal; 0.52 mg/kg/day (equivalent to 2ug/L) for inhalation)
[5] Total MOE = 1/{1/MOE(dermal in oral equivalents) + 1/MOE(inhalation)}

All occupational risk estimates are below HED's level of concern (MOE>100).

4.3.2.a. Worker Post-Application Exposure Assumptions and Assessment

A post-application exposure assessment was not performed. Cultural activities associated with the subject corn uses are likely to result in relatively low levels of dermal exposure. Field corn is planted, cultivated, and harvested mechanically (*website:* Crop Profiles, USDA, Office of Pest Management Policy and Pest Impact Assessment Program, updated 8/23/99). Therefore, potential worker post-application exposures from a herbicide applied pre-emergent or in the early post-emergent stage are expected to be minimal.

4.3.2.b. REI

There is no REI associated with dichlormid.

4.3.2.c. Incident Reports

There have been no reported incidents of accidental exposure.

4.3.3. Residential Exposure

There are no residential uses resulting in non-dietary exposure to infants and children at this time.

4.4. Non-Occupational Off-Target Exposure

There are no non-occupational off-target exposure scenarios for dichlormid.

5.0. RISK ASSESSMENTS AND RISK CHARACTERIZATION

Aggregate exposure risk assessments were performed for acute and chronic aggregate exposure (food + drinking water). DWLOCs were calculated for the U.S. general population and the children subgroup which had the highest dietary exposure. Ground and surface water estimates were provided by EFED. There are no residential uses resulting in non-dietary exposure to infants and children at this time and so a short-/intermediate-term aggregate risk assessment is not applicable for this dichlormid action. Dichlormid has not been classified by the HIARC or HED CARC in terms of potential for carcinogenicity. Therefore, no aggregate cancer risk analysis was completed with this action.

5.1. Acute Aggregate Risk (food + drinking water)

Acute aggregate risk estimates are below HED's level of concern. A Tier 1 acute dietary risk assessment was performed assuming tolerance level residues, default processing factors for all commodities and 100% CT. For acute dietary risk, HED's level of concern is >100% aPAD. Acute dietary risk estimates were 3.4% of the aPAD at the 95th percentile for the general U.S. population and 7.5% of the aPAD for the highest exposure group, all infants (< 1 year old). The estimated acute dietary risk associated with the use of dichlormid on corn RACs is below HED's level of concern. Additional refinement by incorporating %CT information may result in even lower exposure estimates.

TRB has calculated DWLOCs for acute exposure to dichlormid in surface and ground water for the U.S. population and all infants (< 1 year old) to be **338 ppb and 92 ppb,** respectively. The maximum estimated concentrations of dichlormid in surface and ground water, 27.29 and 0.046 ppb, respectively, are less than HED's DWLOCs for dichlormid as a contribution to acute aggregate exposure. Therefore, taking into account the uses proposed in this action, TRB concludes with reasonable certainty that residues of dichlormid in drinking water (when considered along with other sources of exposure for which HED has reliable data) would not result in unacceptable levels of acute aggregate human health risk at this time.

Table 14. Aggregate Risk Assessment for Acute Dietary Exposure to Dichlormid.						
Population Subgroup[1]	Acute Scenario					
	aPAD mg/kg/day	Acute Food Exp mg/kg/day	Max Acute Water Exp mg/kg/day[2]	Ground Water EDWC (ppb)[3]	Surface Water EDWC (ppb)[3]	Acute DWLOC (ppb)[4]
U.S. Population	0.010	0.000336	0.009664	0.046	27.29	338
All Infants (<1 year old)	0.010	0.000752	0.009248	0.046	27.29	92
Children 1-2 years old	0.010	0.000597	0.009403	0.046	27.29	94
Children 3-5 years old	0.010	0.000611	0.009389	0.046	27.29	94
Children 6-12 years old	0.010	0.000464	0.009536	0.046	27.29	95
Youth 13-19 years old	0.010	0.000381	0.009619	0.046	27.29	289
Adults 20-49 years old	0.010	0.000245	0.009755	0.046	27.29	341
Females 13-49 years old	0.010	0.000257	0.009743	0.046	27.29	341
Adults 50+ years old	0.010	0.000148	0.009852	0.046	27.29	296

[1] HED notes that there is a degree of uncertainty in extrapolating exposures for certain population subgroups which may not be sufficiently represented in the consumption surveys, (e.g., non-nursing infants, etc.). Therefore, risks estimated for these subpopulations were included in representative populations having sufficient numbers of survey respondents (e.g., all infants, females, 13-50 years, etc.). Body weights for subgroups: 70 kg adult male; 60 kg adult female; 10 kg child.

[2] Maximum acute water exposure (mg/kg/day) = [(aPAD (mg/kg/day) - acute food exposure (mg/kg/day)]

[3] Drinking water exposure estimates are based on degradation and transport factors for dichlormid coupled with EFED's current GENEEC (surface water) and SCI-GROW (groundwater) screening models for surface and ground water

[4] Acute DWLOC(µg/L) = $\frac{\text{[maximum acute water exposure (mg/kg/day) x body weight (kg)]}}{\text{[water consumption (L) x } 10^{-3} \text{ mg/µg]}}$

5.2 Short- + Intermediate-Term Aggregate Risk (food + residential + drinking water)

There are no residential uses resulting in non-dietary exposure to infants and children at this time and so a short-/intermediate-term aggregate risk assessment is not applicable for this dichlormid action.

5.3. Chronic Aggregate Risk (food + drinking water)

Chronic aggregate risk estimates are below HED's level of concern. A chronic dietary analysis was performed assuming tolerance level residues, default processing factors for all commodities and 100% CT. Chronic dietary risk estimates were 6.1% of the cPAD for the

general U.S. population and 15% of the cPAD for the highest exposure group, children 3-5 years old. The estimated chronic dietary risk associated with the use of dichlormid on corn RACs is below HED's level of concern. Additional refinement by incorporating %CT information may result in even lower exposure estimates.

TRB has calculated DWLOCs for chronic exposure to dichlormid. The DWLOCs are **56** and **15 ppb** for the U.S. population and children (3-5 years old), respectively. The maximum estimated concentrations of dichlormid in surface and ground water, 8.98 and 0.046, respectively, are less than HED's DWLOCs for dichlormid as a contribution to chronic aggregate exposure. Therefore, taking into account the uses proposed in this action, TRB concludes with reasonable certainty that residues of dichlormid in drinking water (when considered along with other sources of exposure for which HED has reliable data) would not result in unacceptable levels of chronic aggregate human health risk at this time.

Table 15. Aggregate Risk Assessment for Chronic (Non-Cancer) Exposure to Dichlormid

Population Subgroup[1]	Chronic Scenario					
	cPAD mg/kg/day	Chronic Food Exp mg/kg/day	Max Chronic Water Exp mg/kg/day[2]	Ground Water EDWC (ppb)[3]	Surface Water EDWC (ppb)[3]	Chronic DWLOC (ppb)
U.S. Population	0.0017	0.000104	0.001596	0.046	8.98	56
All Infants (<1 year old)	0.0017	0.000138	0.001562	0.046	8.98	16
Children 1-2 years	0.0017	0.000213	0.001487	0.046	8.98	15
Children 3-5 years	0.0017	0.000246	0.001454	0.046	8.98	15
Children 6-12	0.0017	0.000188	0.001512	0.046	8.98	15
Youth 13-19	0.0017	0.000142	0.001558	0.046	8.98	47
Adults 20-49	0.0017	0.000085	0.001615	0.046	8.98	57
Females 13-49	0.0017	0.000085	0.001615	0.046	8.98	48
Adults 50+ years	0.0017	0.000049	0.001651	0.046	8.98	58

[1] HED notes that there is a degree of uncertainty in extrapolating exposures for certain population subgroups which may not be sufficiently represented in the consumption surveys, (e.g., non-nursing infants, etc.). Therefore, risks estimated for these subpopulations were included in representative populations having sufficient numbers of survey respondents (e.g., all infants, females, 13-50 years, etc.). Body weights for subgroups: 70 kg adult male; 60 kg adult female; 10 kg child.

[2]Maximum Chronic Water Exposure (mg/kg/day) = [Chronic PAD (mg/kg/day) - Chronic Dietary Exposure (mg/kg/day)]

[3] Drinking water exposure estimates are based on degradation and transport factors for dichlormid coupled with EFED's current GENEEC (surface water) and SCI-GROW (groundwater) screening models for surface and ground water.

[4] Chronic DWLOC(µg/L) = $\frac{\text{[maximum chronic water exposure (mg/kg/day) x body weight (kg)]}}{\text{[water consumption (L) x } 10^{-3} \text{ mg/µg]}}$

6.0. DATA GAPS/LABEL CHANGES

6.1. Chemistry

For the purpose of establishing permanent tolerances for field corn (forage, grain, stover), sweet corn (forage, grain, stover) and pop corn (grain, stover) at 0.05 ppm, the studies provided are not adequate. For permanent tolerances to be set for the use of dichlormid, the following deficiencies need to be addressed:

1. 860.1300: Nature of the Residue - Plants
The studies submitted (MRID No. 46015801) for the purpose of fulfilling the Guideline 860.1300 is scientifically unacceptable and does not satisfy the requirements. It may be upgraded if additional metabolites are identified, including unknown A, to allow a more complete characterization of the nature of the residue of dichlormid in corn.

2. 860.1300: Nature of the Residue - Livestock
The studies submitted (MRID No. 46015802, 46015803) for the purpose of fulfilling the Guideline 860.1300 are scientifically unacceptable and do not satisfy the requirements. The studies do not adequately define the nature of the residues or the residue(s) of concern for dichlormid. They may be upgraded upon further identification of residues representing ?10% and/or 0.05 ppm.

3. 860.1340: Residue Analytical Methods
The requested revised method has not yet been received.

4. 860.1900: Field Accumulation in Rotational Crops
No studies in field accumulation in rotational crops have been submitted. The registrant should submit a field accumulation in rotational crop study in accordance with OPPTS Guideline, 860.1900.

6.2. Toxicology

There are still outstanding data gaps for dichlormid including subchronic dermal and inhalation, neurotoxicity and metabolism studies. Dermal absorption is by default 100% due to neither a dermal absorption nor a dermal toxicity study (for extrapolation) being available.

6.3. Occupational/Residential Exposure

No data gaps.

7.0. ATTACHMENTS

Attachment 1: Dietary Exposure Analyses (available electronically).
Attachment 2: IRLS Form.

B.Hanson:284:CM#2:(703)305-6891:7509C:TRB

Attachment 1: Dietary Exposure Analyses (available electronically).

ATTACHMENT 2. IRLS SHEET			
Chemical Name: 2,2'-dichloro-N,N'-di-2-propenylacetamide	**Common Name:** Dichlormid	☒ Proposed tolerance ☐ Reevaluated tolerance ☐ Other	**Date:** 8/10/05

Codex Status (Maximum Residue Limits)	U. S. Tolerances
X No Codex proposal step 6 or above ☐ No Codex proposal step 6 or above for the crops requested	**Petition Number:** 4F6950 **DP #:** 318075 **Other Identifier:**
Residue definition: N/A	**Reviewer/Branch:** Rate /TRB
	Residue definition: dichlormid

Crop (s)	MRL (mg/kg)	Crop(s)	Tolerance (ppm)
		corn, field	0.05
		corn, pop	0.05
		corn, sweet	0.05

Limits for Canada	Limits for Mexico
X No Limits ☐ No Limits for the crops requested	X No Limits ☐ No Limits for the crops requested
Residue definition: N/A	**Residue definition:** N/A

Crop(s)	MRL (mg/kg)	Crop(s)	MRL (mg/kg)
		cottonseed	0.010

Notes/Special Instructions: S. Funk, 08/23/2005.

13544

R118469

Chemical: Acetamide, 2,2-dichloro-N,N-di-2-propenyl-

PC Code:
900497
HED File Code: 51200 RD Risk Reviews
Memo Date: 11/15/2005
File ID:
Accession #: 412-06-0009

HED Records Reference Center
2/21/2006