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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

DATE: November 8, 2005

ACTION MEMORANDUM

SUBJECT: Inert Reassessment – 2-methyl-2,4-pentanediol, CAS Reg. No. 107-41-5

FROM: Pauline Wagner, Chief Pauline Wagner 11/8/05
Inert Ingredient Assessment Branch

TO: Lois A. Rossi, Director
Registration Division

I. FQPA REASSESSMENT ACTION

Action: Reassessment of one inert ingredient exemption from the requirement of a tolerance. Current exemption is to be maintained.

Chemical: 2-methyl-2,4-pentanediol
CFR: 40 CFR 180.920 formerly 40 CFR § 180.1001(d)
CAS #: 107-41-5

Table 1: Tolerance Exemption Expression

40 CFR	Inert Ingredient	Limits	Uses (Pesticidal)	CAS Reg. No. and Name
180.920	2-methyl-2,4-pentanediol	---	Solvent for formulations used before crop emerges from soil	107-41-5 2,4-Pentanediol, 2-methyl-

Use Summary: 2-methyl-2,4-pentanediol is used as a chemical intermediate, a selective solvent in petroleum refining, a component of hydraulic fluids, an additive for cement, a component of industrial coatings, a solvent for inks, an additive for fuel and lubricants, and an additive in cosmetics. It is also used as a solvent for pesticide formulations applied before crop emerges from soil.

II. MANAGEMENT CONCURRENCE

I concur with the reassessment of the one exemption from the requirement of a tolerance for the inert ingredient 2-methyl-2,4-pentanediol (CAS Reg. No. 107-41-5). I consider the one exemption established in 40 CFR § 180.920 [formerly 40 CFR 180.1001(d)] to be reassessed for purposes of FFDCA's section 408(q) as of the date of my signature, below. A Federal Register Notice regarding this tolerance exemption reassessment decision will be published in the near future.

Lois A. Rossi

Lois A. Rossi, Director
Registration Division

Date: November 18, 2005

CC: Debbie Edwards, SRRD
Joe Nevola, SRRD

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OFFICE OF
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TOXIC SUBSTANCES

November 8, 2005

MEMORANDUM

SUBJECT: Reassessment of the One Exemption from the Requirement of a Tolerance for 2-Methyl-2,4-pentanediol (Hexylene glycol)

FROM: R. Tracy Ward
Inert Ingredient Assessment Branch
Registration Division (7505C)

TO: Pauline Wagner, Branch Chief
Inert Ingredient Assessment Branch
Registration Division (7505C)

Background

Attached is the science assessment for 2-methyl-2,4-pentanediol (hexylene glycol). This assessment summarizes available information on the use, physical/chemical properties, toxicological effects, exposure profile, and environmental fate and ecotoxicity of hexylene glycol. The purpose of this document is to evaluate for reassessment the one (1) existing exemption from the requirement of a tolerance for residues of this inert ingredient as required under the Food Quality Protection Act (FQPA).

Executive Summary

This report evaluates hexylene glycol, a pesticide inert ingredient for which one exemption from the requirement of a tolerance exists for its residues when used as a solvent in pesticide formulations applied to growing crops before crop emerges from soil only under 40 CFR 180.920. This report relies on data and information on hexylene glycol found in the Organization for Economic Cooperation and Development-Screening Information Data Set (OECD-SIDS 2001) submission, a British Industrial Biological Research Association (BIBRA 1991) toxicity profile, Cavender and Sowinski's review in Patty's Toxicology (2001), and two Toxic Substance Control Act Section 8(e) submissions (TSCA 8(e)).

Hexylene glycol (CAS Reg. No. 107-41-5) is an aliphatic alcohol also known as: 2-methyl-2,4-pentanediol; diolane; and 1,1,3-trimethyltrimethylene-diol. It is used as a chemical intermediate, a selective solvent in petroleum refining, a component of hydraulic fluids, a solvent for inks, and as an additive for cement. It is also used in cosmetics and hair care products, textile dye vehicles, and as an additive in fuel and lubricant (NIH 2004; OECD-SIDS 2001). Commercially, hexylene glycol is produced by the catalytic hydrogenation of diacetone alcohol.

Hexylene glycol is low in acute oral and dermal toxicity, with LD_{50} values in excess of 2,000 mg/kg of body weight (bw). It is irritating to the skin and eyes, but it is not a skin sensitizer. It is also has low inhalation toxicity, with an LC_{50} of 160 ppm (0.772 mg/L), which is in excess of the saturated vapor concentration. The chemical is also not genotoxic in either mammalian or non-mammalian cells *in vitro*. Maternal and developmental NOAELs range from 300 to 500 mg/kg/day of bw. There were no carcinogenicity studies.

Dietary (food and drinking water) and residential (inhalation and dermal) exposures of concern are unlikely with hexylene glycol, because it is used in pesticide products that are applied infrequently (because they are only applied before the crop emerges from the soil), and because the chemical readily biodegrades in the environment. Hexylene glycol is expected to distribute in the environment primarily in water, and to biodegrade rapidly. Hexylene glycol has low toxicity to terrestrial and aquatic organisms, and has a low potential for bioaccumulation.

Taking into consideration all available information on hexylene glycol, it has been determined that there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure to this chemical when considering dietary exposure and all other non-occupational sources of pesticide exposure for which there is reliable information. Therefore, it is recommended that the one (1) exemption from the requirement of a tolerance established for residues of hexylene glycol und 40 CFR 180.920 can be considered reassessed as safe under section 408(q) of the Federal Food, Drug and Cosmetic Act (FFDCA).

I. Introduction

This report evaluates the inert ingredient hexylene glycol, which has one exemption from the requirement of a tolerance when used in pesticide formulations as a solvent for formulations used before crop emerges from soil when applied to growing crops only under 40 CFR 180.920.

II. Use Information

A. Pesticide Uses

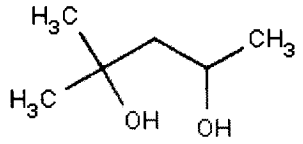
The inert ingredient hexylene glycol is used as a solvent in pesticide formulations applied before the crop emerges from the soil.

Table 1. Tolerance Exemptions Being Reassessed in this Document				
40 CFR [1/]	Tolerances Exemption Expression	Limits	Uses (Pesticidal)	CAS Reg. No. and Name
180.920	2-methyl-2,4-pentanediol	---	Solvent for formulations used before crop emerges from soil	107-41-5 2,4-Pentanediol, 2-methyl-
1. Residues listed in 40 CFR 180.920 are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.				

B. Other Uses.

Hexylene glycol is used as a chemical intermediate, a selective solvent in petroleum refining, a component of hydraulic fluids, an additive for cement (Curme and Johnson, 1952, as cited in Patty's Toxicology), a component of industrial coatings, a solvent for inks, an additive for fuel and lubricants(OECD-SIDS 2001), and an additive in cosmetics (Cosmetic Ingredient Review, 1985).

III. Physical and Chemical Properties

Table 2. Physical and Chemical Properties of Hexylene Glycol (Measured=M or Estimated=E)		
Parameter	Value	Source
Structure		NIH, 2004
Common Names	2-methyl-2,4-pentanediol; diolane; and 1,1,3-trimethyltrimethylene-diol	NIH, 2004
CAS Reg. No.	107-41-5	
Empirical Formula	$C_6 H_{14} O_2$	
Physical State	Colorless liquid with a mild, sweetish odor	NIH, 2004
Molecular Weight	118.175 (M)	NIH, 2004
Water Solubility	1.00×10^6 mg/L at 25° C (M); very water soluble	NIH, 2004
Melting Point	-50° C (M)	NIH, 2004
Henry's Law Constant	4.06×10^{-7} atm-m^3/mole @ 25°C (E)	NIH, 2004
Vapor Pressure	0.013 mm Hg @ 25°C (M)	NIH, 2004
Octanol/Water Partition Coefficient	Log P = 0.580 (E)	NIH, 2004

IV. Hazard Assessment

A. Hazard Profile

The information on the toxicity of hexylene glycol presented in this profile is from an OECD-SIDS (2001) submission, a BIBRA report (1991), a review by Cavender and Sowinski in Patty's Toxicology (2001), a TSCA 8(e) submission (1995), and a TSCA 8(e) Compliance Audit Program (CP) submission (1992).

B. Toxicological Data

Acute oral toxicity: Based on the OECD-SIDS report (2001), hexylene glycol appears to have low acute toxicity. In acute oral toxicity studies of hexylene glycol, rats were determined to have an LD_{50} ranging between 2 g/kg of bw (Gardner, 1996a, as cited in the OECD-SIDS) and 4.47 g/kg bw (BIBRA, 1991, Industrial Biotest, 1970, and German MAK Commission, 1997, all as cited in OECD-SIDS). There were no deaths at 2 g/kg bw, and no macroscopic lesions noted at necropsy in the majority of rats in this study (Gardner, 1996a, as cited in OECD-SIDS). No other information was available on this study.

In a TSCA 8(e) CP submission (#8EHQ-1092-12673, 1992), the acute oral LD_{50} in rats was determined to be greater than 500 g/kg, but less than 5000 mg/kg bw. There were no other dose levels tested between 500 and 5000 mg/kg bw in this study. There were no deaths at 500 mg/kg bw, but rats exhibited an increase in salivation, retching, dyspnea and a decrease in activity and limb tone. These effects were reversible after 2 hours, and all rats appeared normal at the end of the 14 days. At the 5000 mg/kg bw dose of hexylene glycol, all rats died in the first day after exhibiting the same symptoms as the lower dose, along with marked ataxia, prostration, and alterations in placing, pinna and corneal reflexes.

Acute dermal toxicity: Topical application of hexylene glycol did not cause death in rats at up to 2000 mg/kg bw in a study by Gardner (1996b as cited in OECD-SIDS) with no macroscopic lesions at necropsy. In another study, there were no deaths in rabbits treated with 200 and 2000 mg/kg bw of the chemical (TSCA 8(e) CP #8EHQ-1092-12673, 1992). There was slight to moderate edema and erythema at both doses during the first 24 hours, with no relationship between dose level or sex and the intensity of skin reaction in the subjects. Throughout the 14-day observation period, both doses induced varying degrees of necrosis, blanching and pus between skin layers. At the end of the observation period, slight to moderate desquamation, leathery skin texture and fissuring were noted in all test subjects.

Acute inhalation toxicity: There were a few older studies available on the inhalation toxicity of hexylene glycol of undetermined reliability. These studies suggest the chemical has low inhalation toxicity. Rats exposed for 1 hour to 0.31 mg/L of hexylene glycol vapor survived and no LC_{50} was determined (Biofax, 1970, as cited in BIBRA). There were no deaths in rats exposed to saturated hexylene glycol vapor at a concentration of about 160 ppm, or 0.772 mg/L (Union Carbide, 1949, Shell Chemical Co., 1958, and Smyth and Carpenter, 1948, as cited in Patty's Toxicology). No LC_{50} was determined and no further study details were given.

Table 3. Summary of Acute Toxicity Data for Hexylene Glycol				
Parameter	**Toxicity Value**	**Toxicity Category**	**Comments**	**Reference**
Oral LD_{50}, Rat	>2 but <5 g/kg bw	III	No deaths at 2 g/kg and no macroscopic lesions at this dose at necropsy. No other information given.	Gardner, 1996a; BIBRA, 1991; Industrial Biotest, 1970; and German MAK Commission, 1997, as cited in OECD-SIDS
Oral LD_{50}, Rat	> 0.5 but <5.0 g/kg bw	III	There were no deaths at 0.5 mg/kg, but all rats died at 5 g/kg dose level.	TSCA 8(e) CP, 1992
Dermal LD_{50}, Rat	> 2 g/kg bw	III/IV	No deaths at this dose and no macroscopic lesions as this dose at necropsy.	Gardner, 1996b, as cited in OECD-SIDS
Dermal LD_{50}, Rabbit	> 2 g/kg bw	III/IV	Slight to moderate edema and erythema starting at 200 mg/kg, but no deaths.	TSCA 8(e) CP, 1992
Inhalation LC_{50}, Rat (1 hour)	> 64 ppm, or > 0.31 mg/L	II/III	Rats exposed to this concentration survived.	Bio-fax, 1970, as cited in BIBRA
Inhalation LC_{50}, Rat (8 hours)	> 160 ppm, or > 0.772 mg/L	III/IV	Rats exposed to saturated vapor survived.	Union Carbide, 1949; Shell Chemical Co., 1958; and Smyth, and Carpenter, 1948; as cited in Patty's Toxicology
Eye Irritation, Rabbit	0.1 mL	II	The undiluted material caused irritation of conjunctiva and cornea that healed within 8 days.	Gardener, 1996b, as cited in OECD-SIDS
Eye Irritation, Rabbit	0.1 mL	II	The chemical produced severe eye irritation and complete corneal opacity after 72 hours.	TSCA 8(e) CP, 1992
Dermal Irritation, Rat (24 hours)	2000 mg/kg bw	IV	Covered application of undiluted chemical for 24 hours produced no irritation.	Gardener, 1996b, as cited in OECD-SIDS
Dermal Irritation, Rabbit (4 hours)	0.5 mL	III	Semi-occlusive exposure to pure chemical produced slight to moderate erythema that was reversible, and no edema.	Parcel, 1995, as cited in OECD-SIDS
Dermal Irritation, Rabbit (24 hours)	0.5 mL	III	Covered application of the chemical produced slight to moderate edema and erythema at 72 hours.	TSCA 8(e) CP, 1992

Eye Irritation: Some conjunctival redness and very slight corneal opacity occurred in rabbits upon application of 0.1 mL undiluted hexylene glycol into the eyes (Gardener, 1996b, as cited in OECD-SIDS). All symptoms resolved within 72 hours to 8 days. The TSCA 8(e) CP submission (1992) reported severe eye irritation when 0.1 mL of the chemical was applied to the conjunctival sacs of rabbits. All rabbits had complete corneal opacity after 72 hours, along with purulent discharge and marked extreme iridal and conjunctival irritation. No follow-up observations were described in this study after the 72-hour period.

Skin irritation: In a 4-hour semi-occlusive dermal irritation study, rabbits treated with 0.5 mL of undiluted hexylene glycol had slight, but reversible, erythema after 72 hours (Parcel, 1995, as

cited in OECD-SIDS). There was no irritation observed following a 24-hour covered application of 2000 mg/kg undiluted product (Garder, 1996b, as cited in OECD-SIDS). In the TSCA 8(e) CP submission (1992), it was observed that a 24-hour covered application of 0.5 mL of hexylene glycol to rabbit skin produced slight to moderate erythema and severe edema at 24 hours. At 72 hours, both the erythema and edema were slight to moderate in intensity.

Skin Sensitization: In a skin sensitization assay on guinea pigs, undiluted hexylene glycol was used for both topical induction and challenge applications (Gardner, 1996d, as cited in OECD-SIDS). A challenge was also conducted using a 50% aqueous solution. There were no positive sensitization responses.

Subacute/subchronic Toxicity: In a 90-day subchronic toxicity study, hexylene glycol was administered by oral gavage to rats at dose levels of 50, 150, or 450 mg/kg bw/day (Fabreguettes, 1999b, as cited in OECD-SIDS). A functional observational battery test gave no indication of neurotoxicity. In both sexes, hyperplasia, hyperkeratosis, inflammatory cell infiltration and edema of the mucosa and submucosa of the stomach were observed starting at 150 mg/kg/day. These changes were indicative of a local irritative effect resulting from the oral gavage procedure. Hepatocellular hypertrophy with increased liver weight was observed at 450 mg/kg/ day in both sexes, and in males at 150 mg/kg/day. In the absence of degenerative or necrotic changes these findings were considered to be adaptive responses. At 150 and 450 mg/kg/day, increased kidney weights and increased incidence of acidophilic globules in the tubular epithelium in males were suggestive of male rat specific alpha-2-microglobulin nephropathy, which is not a truly toxic effect of the chemical, but a response by male rats to a chemical challenge. Observed changes were either fully or partially reversible over the 4-week recovery period. There were no adverse effects on the reproductive organs. No effects were observed at 50 mg/kg/day. However, a NOAEL of 450 mg/kg/day was determined for systemic toxicity because the effects described were either produced by irritation from the oral gavage procedure, or were considered adaptive responses. A range-finding 14-day study (Fabreguettes, 1999a, as cited in OECD-SIDS) gave similar results.

Ten rats and a rabbit exposed to an aerosol of hexylene glycol at a concentration of 0.7 mg/L (about 145 ppm) for 7 hr/day for 9 days survived with mild upper respiratory irritation. No histopathological effects were reported (Union Carbide, 1976, as cited in OECD-SIDS). No controls were used and no other details were given in the report.

Genotoxicity: Hexylene glycol was tested for genotoxicity *in vitro* in mammalian and non-mammalian cells (Meyer et al, 1985 and Brooks et al, 1988, as cited in OECD-SIDS). Hexylene glycol (≥99% a.i.) was non-mutagenic in the Ames assay in *Salmonella typhimurium* strains, as well as in *Escherichia coli* WP2 uvrA pKM101. When tested at concentrations up to 4000 μg/plate in the presence or absence of metabolic activation, there was no evidence of cytotoxicity at any dose level, and no increase in reverse mutation rate with any of the bacterial strains.

Mitotic gene conversion in the yeast *Saccharomyces cerevisiae* JD1 was measured in the liquid suspension assay at concentrations up to 5.0 mg hexylene glycol/mL in the presence or absence of rat liver S9 fractions. No significant effect on cell viability and no increase in the rate

of mitotic gene conversion was observed (Meyer et al, 1985 and Brooks et al, 1988, as cited in OECD-SIDS).

In a hamster ovary cell assay, cultures were treated with hexylene glycol at concentrations of up to 5000 μg/mL in the presence or absence of metabolic activation. There was no evidence of cytotoxicity at any dose level, and no increase in the number of chromosome aberrations (Meyer et al, 1985 and Brooks et al, 1988, as cited in OECD-SIDS).

Reproductive/Developmental Toxicity: There were no guideline reproduction studies available for this assessment, however, no adverse effects on reproductive organs (including testes, prostate, seminal vesicles, epididymis, ovaries, vagina, and uterus) were observed in the 90-day gavage study in which rats were administered hexylene glycol at doses up to 450 mg/kg/day (Fabreguettes, 1999a, as cited in OECD-SIDS).

In a range finding developmental toxicity study, pregnant rats were administered 30, 300, or 1000 mg/kg bw/day of hexylene glycol by gavage in 5 mL/kg of vehicle on gestation days (GD) 6-15 (Clode, 1997, as cited in OECD-SIDS). The NOAEL for maternal toxicity was 300 mg/kg/day based on a statistically significant reduction in group mean body weight gain and food consumption at 1000 mg/kg/day. There was a marginal, non-statistically significant reduction in fetal body weight at 1000 mg/kg/day. Marginally higher incidences of fetal variations, some of which were statistically significant (occipitals incompletely ossified, 21.6%; extra thoracolumbar ribs, 18.7%; and hyoid arch not ossified, 18%), occurred at 1000 mg/kg/day. A delay in the normal ossification process was also observed in fetuses, but this was considered by the authors to be related to reduced maternal body weight gain at this dose level. The NOAEL and LOAEL for maternal and fetal developmental toxicity were determined to be 300 and 1000 mg/kg/day, respectively.

In another developmental toxicity study, pregnant rats received 500, 1200, or 1600 mg/kg bw/day of hexylene glycol by gavage in 10 mL/kg of vehicle on GD 6-17 (TSCA 8(e), 1995). At 1200 and 1600 mg/kg/day, dams had ataxia and reductions in mean weight gain and food consumption. At the 1600 mg/kg/day, pregnant rats had mean weight loss, and one female aborted prior to the end of the study. Maternal toxicity at these levels corresponds to decreased fetal body weights and gravid uterine weights. Additionally, at 1600 mg/kg/day, there was one abortion and one whole litter resorption. However, the number of fetal malformations, such as increased incidence of skeletal variations (delayed ossification, extra ribs), was not significantly different from controls. A maternal NOAEL of 500 mg/kg/day was determined by the Agency, and the same NOAEL was determined in the study for fetal toxicity. These results support the results of Clode's (1997) study described above and indicate that hexylene glycol has low potential for developmental toxicity.

Carcinogenicity: There were no carcinogenicity studies available for hexylene glycol.

C. Special Consideration for Infants and Children

Hexylene glycol has low subchronic toxicity, with developmental NOAELs ranging from 300 to 500 mg/kg/day. In addition, maternal toxicity corresponded with fetal toxicity in developmental studies, suggesting that offspring do not have greater sensitivity to hexylene glycol than adults. Based on this information, there is no concern, at this time, for increased sensitivity to infants and children to hexylene glycol when used as an inert ingredient in pesticide formulations. For these reasons, a safety factor analysis has not been used to assess the risks resulting from the use of hexylene glycol and, therefore, the additional tenfold safety factor for the protection of infants and children is also unnecessary.

V. Environmental Fate Characterization/Drinking Water Considerations

Hexylene glycol can be released into the environment from various industrial sources, wastewater effluents from wastewater treatment plants, and its use as an inert ingredient in pesticide products. Biological screening studies (Blok, 1985, as cited in OECD-SIDS) have demonstrated that hexylene glycol readily biodegrades. It is infinitely water soluble, and has low potential to sorp to soil, so it is likely to leach from soil and distribute primarily to water. Leaching to groundwater, although likely under certain conditions, will be reduced due to the compound's biodegradability. Releases to surface water will undergo substantial biological degradation prior to reaching drinking water intakes. As a result, concentrations in drinking water are likely to be below the low parts per billion. Hexylene glycol is slightly volatile (0.013 nn Hg @ 25°C), with a Henry's Law constant of 4.06×10^{-7} atm-m^3/mole @ 25°C. If released to the atmosphere, the chemical has a calculated half-life of 9 hours due to photo-oxidation (OECD-SIDS 2001).

VI. Exposure Assessment

Hexylene glycol is used as a chemical intermediate, a selective solvent in petroleum refining, a component of hydraulic fluids, a solvent for inks, and as an additive for cement. It is also used in cosmetics (at 0.1 to 25% of the formulation), textile dye vehicles, and as an additive in fuel and lubricant. According to the OECD-SIDS (2001) profile, consumer exposure to hexylene glycol is expected to occur primarily through its use in cosmetics, antifreezes and hydraulic fluids.

Dietary (food and drinking water) and residential (inhalation and dermal) exposures of concern are unlikely with hexylene glycol, because it is used in pesticide products that are applied infrequently (because they are only applied before the crop emerges from the soil), and because the chemical readily biodegrades in the environment.

VII. Aggregate Exposure

In examining aggregate exposure, FFDCA section 408 directs EPA to consider available information concerning exposures from the pesticide residue in food and all other nonoccupational exposures, including drinking water from ground water or surface water and exposure

through pesticide use in gardens, lawns, or buildings (residential and other indoor uses).

For hexylene glycol, a qualitative assessment for all pathways of human exposure (food, drinking water, and residential) is appropriate given the lack of human health concerns associated with exposure to hexylene glycol as an inert ingredient in pesticide formulations.

VIII. Cumulative Exposure

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 hexylene glycol and any other substances, and this material 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 hexylene glycol 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.

IX. Human Health Risk Characterization

Hexylene glycol is low in acute oral and dermal toxicity, with LD_{50} values in excess of 2000 mg/kg. It is irritating to the eye and skin, but is not a skin sensitizer. It has low inhalation toxicity, with an inhalation LC_{50} (>160 ppm, or 0.772 mg/L) that is in excess of the saturated vapor concentration. In addition, the vapor pressure is sufficiently low at normal temperatures so that it does not present an inhalation hazard. The chemical is also not genotoxic in either mammalian or non-mammalian cells *in vitro*. Developmental toxicity occurred at high doses in studies, with maternal and developmental NOAELs ranging from 300 to 500 mg/kg/day.

Dietary (food and drinking water) and residential (inhalation and dermal) exposures of concern are unlikely with hexylene glycol because it is used in pesticide products that are applied infrequently (because they are only applied before the crop emerges from the soil), and because the chemical readily biodegrades in the environment.

Taking into consideration all available information on hexylene glycol, there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure when considering dietary exposure (including crops, meats, and fish) and all other non-occupational sources of pesticide exposure for which there is reliable information. Therefore, it is recommended that the one exemption from the requirement of a tolerance established for residues of hexylene glycol when used as a solvent in pesticide formulations applied to growing

crops before crop emerges from soil only under 40 CFR 180.920 can be considered reassessed as safe under section 408(q) of the FFDCA.

X. Ecotoxicity and Ecological Risk Characterization

Hexylene glycol is classified as practically non-toxic, according to OPP's classification scheme, to aquatic organisms, with the LC_{50}/EC_{50} being in excess of 2,800 mg/L (NIH 2004). A toxicity test on frog tadpoles (*Rana catesbiana*) produced an LC_{50} of 11,800 mg/L, which suggests low toxicity of this substance to this group of sensitive aquatic organisms. The chemical is also of low toxicity to algae, with a 72-hour EC_{10} and EC_{50} of >429 mg/L for the algae *Slenastrum capricornutum*. Based on the log K_{ow} of 0.58, it has low potential to bioaccumulate (BCF = 3.162, as calculated using the Syracuse Aopwin V1.85 model, OECD-SIDS 2001). Because of hexylene glycol's low potential for bioaccumulation and low toxicity in terrestrial and aquatic organisms, it is unlikely to be a risk concern to nontarget species at application rates anticipated in pesticide formulations.

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TSCA 8(e) No. 8EHQ-1195-13392. Microfiche No. OTS0572134-1. 1995. Support: Draft Summary of Results of Range-Finding Toxicity Study with 2-Methyl-2,4-Pentanediol in Rats, with Cover Letter Dated 11/22/95.

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