ATTACHMENT I – HISTORICAL MONITORING FOR THE TOXIC AIR CONTAMINANT PROGRAM

HISTORICAL MONITORING FOR THE TOXIC AIR CONTAMINANT PROGRAM

The Air Resources Board, in consultation with DPR, conducts ambient monitoring for a variety of pesticides in accordance with the Toxics Air Contaminant (TAC) monitoring program. Monitoring for pesticides is conducted in counties with the highest use for a particular pesticide to be monitored and during the season of highest use. Information is available from ambient air sampling conducted under the TAC program for 12 of the pesticides included in the monitoring study in Parlier: 1,3-dichloropropene, chlorpyrifos, diazinon, endosulfan, EPTC, malathion, MITC, methyl bromide, molinate, permethrin, propargite, simazine, and S,S,S-tributyl phosphorotrithioate. Summaries of the TAC monitoring are given in Attachment I.

The fumigants, 1,3-dichloropropene (1,3-D) and methyl bromide have been monitored over several studies. 1,3-D was measured over the course of eight days in Merced County in April 1990 (California Air Resources Board, 1991). The maximum concentration was 160 micrograms per cubic meter ($\mu g/m^3$) and the average was 24 $\mu g/m^3$. Following suspension of 1,3-D use in California, ARB monitored ambient air concentrations in Merced County in March through April 1995 during reintroduction of use of 1,3-D with mitigation measures m^3 (California Air Resources Board, 1995). The 24-hour concentrations ranged from no detectable amount (ND) to 7.4 $\mu g/m^3$. Similar monitoring conducted in Kern County during May to December, 1995 measured concentrations up to 27.0 $\mu g/m^3$ (California Air Resources Board, 1996). In July 1996, following permit condition revisions, 24-hour 1,3-D concentrations measured in Kern County ranged from 0.10 $\mu g/m^3$ to 13 $\mu g/m^3$ (California Air Resources Board, 1997). The highest 24-hour ambient air concentrations measured in Kern in 2000 and 2001 were 135 $\mu g/m^3$ and 96 $\mu g/m^3$, respectively (California Air Resources Board, 2000 and 2002b). In Monterey and Santa Cruz Counties the highest 24-hour concentrations measured were 4.34 $\mu g/m^3$ and 18.9 $\mu g/m^3$ in 2000 and 2001, respectively (California Air Resources Board, 2001a and 2002a).

Ambient air concentration of methyl bromide was also monitored in Kern, Monterey and Santa Cruz Counties in 2000 and 2001(California Air Resources Board, 2000, 2001a, 2002a and 2002b). The highest 24-hour concentrations measured in Kern in 2000 and 2001 were 55 $\mu g/m^3$ and 98.3 $\mu g/m^3$, respectively. In Monterey and Santa Cruz Counties the highest 24-hour concentrations measured were 119 $\mu g/m^3$ and 142 $\mu g/m^3$ in 2000 and 2001, respectively.

MITC was measured in Kern County in July 1993 using sorbent tubes (Baker et al., 1996). at four sites over the course of eight days. Four sites were measured over the course of eight days with 83 percent of the samples above the minimum quantitation level of 0.01 $\mu g/m^3$. The maximum 24-hour concentration was 18 $\mu g/m^3$, the average was 5.8 $\mu g/m^3$, and the mean urban background concentration was 2.1 $\mu g/m^3$. In June 2000, ARB monitored for MITC and MIC (another breakdown product of metam-sodium) in Kern County using sorbent tubes (ARB, 2003a) at five sites over the course of eight weeks. The 8-week average concentrations for MITC ranged from 0.12 $\mu g/m^3$ to 2.5 $\mu g/m^3$ at the five sites with 44 percent of the samples containing concentrations of MITC above the EQL of 0.42 $\mu g/m^3$. Of the 396 ambient air samples, none contained MIC concentrations above the EQL of 0.42 $\mu g/m^3$. The urban background site had a maximum 24-hour concentration of 1.7 $\mu g/m^3$ and 42 percent of the samples contained a concentration above the EQL of 0.42 $\mu g/m^3$. In the fall of 2000, ARB

monitored ambient air concentrations of MITC and MIC in Monterey and Santa Cruz Counties at five sites for eight weeks, four 24-hour samples per week. Of the 192 samples, only one sample (0.43 $\mu g/m^3$) had a concentration of MITC above the EQL of 0.42 $\mu g/m^3$, and two samples were below the EQL but above the MDL. None of the samples contained any detectable concentration of MIC. There were no measurable concentrations of MITC or MIC at the urban background sampling location.

Chlorpyrifos and its oxygen analog were measured in Tulare County during May and June 1996 (California Air Resources Board, 1998b). The maximum concentration was 0.815 $\mu g/m^3$ or 815 nanogram per cubic meter (ng/m^3), and the mean urban background concentration was 27 ng/m^3.

Diazinon was measured in Fresno County during January and February 1997 at four sites over a six-week period (California Air Resources Board, 1998a). The maximum concentration was 290 ng/m^3, and all urban background sample concentrations were below the level of quantitation.

Ambient air monitoring of endosulfan was conducted in Fresno County from July through August, 1996 (California Air Resources Board, 1998c). Chemical analysis was performed for two isomers of endosulfan (endosulfan I and endosulfan II) as well as endosulfan sulfate. The highest 24-hour values observed for the study were 140 ng/m^3 and 26 ng/m^3 for endosulfan I and II, respectively. Endosulfan sulfate was not found above the quantification limit of 6.6 ng/m^3.

EPTC was measured in Imperial County during October and November 1996 at four sites over the course of 24 days (California Air Resources Board, 1998d). The maximum EPTC concentration was 240 ng/m^3, and all of the urban background samples had concentrations below the limit of quantitation.

Malathion and its breakdown product malaoxon were measured in Imperial County during February and March 1998 (California Air Resources Board, 1999a). Four sites were measured over the course of 12 days. The maximum malathion concentration was 90 ng/m^3, and the mean urban background concentration was 5.7 ng/m^3.

Molinate was measured in Colusa County during peak use period in May, 1992 (Kollman, 1995). Ambient 24-hour concentrations ranged from 160 to 1170 ng/m^3.

Naled/dichlorvos (DDVP) were measured in Tulare County during May and June 1991 using XAD-2, and analyzed by gas chromatography (California Air Resources Board, 1993). Four sites were measured over the course of 16 days and 14 percent of the sample concentrations were above the minimum quantitation level of 40 ng/m^3. The maximum concentration was 65 ng/m^3, and the mean urban background concentration was 68 ng/m^3.

Permethrin was measured in Monterey County during August and September 1997 at four sites over the course of 24 days. (California Air Resources Board, 1998e). Five percent of the sample concentrations were above the limit of detection, but were below the limit of quantitation (15 ng/m^3 for a 24-hour sampling period).

Propargite was measured in Fresno and Kings Counties from June 24 to August 4, 1999 (California Air Resources Board, 2001b). The highest 24-hour propargite concentration was 1300 ng/m^3. Fourty percent of the samples were above the quantitation limit of 23 ng/m^3.

Simazine was measured in Fresno County during February through April 1998 at four sites over the course of 24 days (California Air Resources Board, 1999b). The maximum concentration was 18 ng/m^3; all background sample concentrations were below the estimated quantitation limit.

The cotton defoliant S,S,S-tributyl phosphorotrithioate (DEF) was monitored four days a week at four sites in Fresno County during September through early November in 1987 (ARB, 1988). Maximum detection was 330 ng/m^3, and 17 percent of the urban background samples contained concentrations above the MDL of 1.1 ng/m^3.

REFERENCES

California Air Resources Board. 1988. Pilot Analysis of DEF in Air. Memorandum to Jack Parnell, Department of Food and Agriculture from James D. Boyd, Air Resources Board. Dated December 30, 1988.

California Air Resources Board. 1991. Telone (1,3-dichloropropene) Monitoring in Merced County. Project No. C90-014. January 4, 1991. Sacramento, CA.

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California Air Resources Board. 1996. Ambient Air Monitoring in Kern County for Telone (1,3-dichloropropene) During DowElanco's Commercial Reintroduction, May-December, 1995. Project No. C94-071-K. November 8, 1996. Sacramento, CA.

California Air Resources Board. 1997. Report for 1996 Ambient Monitoring of Telone in Kern County. Project No. C96-045. October 14, 1997. Sacramento, CA.

California Air Resources Board. 1998a. Ambient Air Monitoring of Diazinon in Fresno County During Winter, 1997. Project No. C96-036. April 6, 1998. Sacramento, CA.

California Air Resources Board. 1998b. Application and Ambient Air Monitoring of

Chlorpyrifos (and the oxon analogue) in Tulare County During Spring/Summer, 1996. Project No. C96-041. April 7, 1998. Sacramento, CA.

California Air Resources Board. 1998c. Air Monitoring of Endosulfan in Fresno County (Ambient) and in San Joaquin County (Application). Project No. C96-034. April 17, 1998. Sacramento, CA.

California Air Resources Board. 1998d. Air Monitoring of EPTC in Merced County (Application) and in Imperial County (Ambient). Project No. C96-035. June 10, 1998. Sacramento, CA.

California Air Resources Board. 1998e. Application (Butte County) and Ambient (Monterey County) Air Monitoring of Permethrin. Project No. 97-041. November 17, 1998. Sacramento, CA.

California Air Resources Board. 1999a. Application and ambient air monitoring of Malathion in Imperial County. Project No. C98-002. January 28, 1999. Sacramento, CA.

California Air Resources Board. 1999b. Application (Tulare County) and Ambient (Fresno County) Air Monitoring of Simazine. Project No. C97-071. November 22, 1999. Sacramento, CA.

California Air Resources Board. 2000. Ambient Air Monitoring for Methyl Bromide and 1,3-dichloropropene in Kern County – Summer 2000. Project No. C00-028. December 27, 2000. Sacramento, CA.

California Air Resources Board. 2001a. Ambient Air Monitoring for Methyl Bromide and 1,3-dichloropropene in Monterey/Santa Cruz Counties – Fall 2000. Project No. C00-028. January 31, 2001. Sacramento, CA.

California Air Resources Board. 2001b. Report for the Application and Ambient Air Monitoring for Propargite and Bifenthrin in Fresno and Kings Counties. Project Nos. C99-032, C99-032a, C99-033, and C99-033a. August 8, 2001. Sacramento, CA

California Air Resources Board. 2002a. Ambient Air Monitoring for Methyl Bromide and 1,3-dichloropropene in Monterey and Santa Cruz Counties – Fall 2001. Project No. P-01-004. March 29, 2002. Sacramento, CA.

California Air Resources Board. 2002b. Ambient Air Monitoring for Methyl Bromide and 1,3-dichloropropene in Kern County – Summer 2001. Project No. P01-004. June 20, 2002. Sacramento, CA.

California Air Resources Board. 2003a. Ambient Air Monitoring for Chloropicrin and Breakdown Products of Metam Sodium in Kern County – Summer 2001. Project No. P01-004. November 13, 2003. Sacramento, CA.

California Air Resources Board. 2003b. Ambient Air Monitoring for Chloropicrin and Breakdown Products of Metam Sodium in Monterey and Santa Cruz Counties – Fall 2001. Project No. P01-004. December 23, 2003. Sacramento, CA.

ATTACHMENT II – STANDARD OPERATING PROCEDURES

To reduce the consumption of paper, the Standard Operating Procedures (SOPs) are available on our Departmental website. If needed, a hardcopy can be requested from the authors.

STANDARD OPERATING PROCEDURES

1. Administrative Standard Operating Procedures

Personnel Organization and Responsibilities for Studies
http://www.cdpr.ca.gov/docs/empm/pubs/sops/admn002.htm

2. Equipment Standard Operating Procedures

Instructions for Calibration and Use of SKC Inc. Personal Sample Pumps
http://www.cdpr.ca.gov/docs/empm/pubs/sops/eqai001.pdf

3. Field Sampling Standard Operating Procedures

Preparation of Air Sampling Tubes and Resin Jars
http://www.cdpr.ca.gov/docs/empm/pubs/sops/fsai0101.pdf

4. Quality Assurance and Quality Control Standard Operating Procedures

Transporting, Packaging and Shipping Samples from the Field to the Warehouse or Laboratory.
http://www.cdpr.ca.gov/docs/empm/pubs/sops/qaqc0401.pdf

Sample Tracking Procedures
http://www.cdpr.ca.gov/docs/empm/pubs/sops/QAQC003.02.pdf

Chemistry Laboratory Quality Control.
http://www.cdpr.ca.gov/docs/empm/pubs/sops/qaqc001.pdf

5. Department of Food and Agriculture, Center for Analytical Chemistry Standard Operating Procedures

Determination of MITC in Air By GC/NPD or GC/TSD

Determination of Selected Pesticides Collected on XAD-4 Resin by High Performance Liquid Chromatography Ion Trap Mass Spectrometry and Gas Chromatography Mass Spectrometry

Determination of Atrazine, Bromacil, Cyanazine, Diuron, Hexazinone, Metribuzin, Norflurazon, Prometon, Prometryn, Simazine, Deethyl Atrazine (DEA), Deisopropyl Atrazine (ACET), and Diamino Chlorotriazine (DACT) in Well Water and River Water By Liquid Chromatograph – Atmospheric Pressure Chemical Ionization Mass Spectrometry.

ATTACHMENT III – PESTICIDE USE PATTERNS

Table 1: Pesticides included in DPR's Environmental Justice Pilot Project
Agricultural uses emphasize Parlier area pesticide use patterns. Nonagricultural uses listed are those allowed by California product labels. [Also please see the notes which follow these tables]

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
azinphos-methyl (Guthion, Gowan Azinphos, Azinphosmethyl-various brands)	Insecticide; organophosphate chemical *(see definition in notes at end of table)* for control of a broad spectrum of insects, mites, and other arthropod pests	Ground or aerial preplant or in-crop application to all nuts, vegetables, and fruits (including raisins), grains, forage/fodder crops, pulses, cotton, ornamentals; used in nurseries; trees/forestry	None
chlorine (several labels)	Antimicrobial; used to kill bacteria, fungi, other animal/plant pathogens, and algae	Preventive or postharvest disinfection of poultry, eggs, fish, meat, dairy, turf, and vegetable and fruit crops, including nectarines, peaches, and plums	Used in commercial, industrial, and residential settings including packing houses, water systems and water treatment, swimming pools, and other aquatic sites
chlorpyrifos (Dursban, Lorsban, Nufos, Lock-On, Chlorpyrifos-various brands)	Insecticide; an organophosphate chemical *(see notes at end)* effective against a broad spectrum of arthropod pests including flies, mosquitoes, cockroaches, ants, wasps, termites, ticks and lice	Many crops including grapes and wine grapes, raisins, nectarines, peaches, plums; all use on post-bloom apples or tomatoes prohibited; used for quarantine treatment, in nurseries and greenhouses, and with turf and ornamentals; animal husbandry premises, livestock and livestock ear tags	**Dursban formerly used widely in homes and gardens; these uses phased out as a result of an agreement between the U.S. EPA and the manufacturer. Some nonagricultural uses of chlorpyrifos by professional pest control operators and vector control districts are still allowed.**
copper hydroxide (Champ, Champion,	Antimicrobial; used to kill fungi, bacteria, and	Ground or aerial applications to a broad range of crops, such as all	In wood preservatives, coatings, and marine anti-foulant; applied to

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
Kocide, Nu-Cop, etc.)	algae	fruits (including raisins), nuts, and field crops, vegetables; ornamentals, turf/lawns, mulch; in greenhouses, nurseries, and gardens; trees/forestry/lumber	fabric surfaces; used in industrial, institutional, and commercial settings for buildings and structures, uncultivated areas (including pavement, rights-of-way), and recreational areas (such as tennis courts, golf courses)
copper oxide (ous) (Nordox, Chem Copp, etc.)	Fungicide; used to control fungi, including crop diseases	Ground or aerial application in a wide range of crops such as nuts, fruits (including grapes and wine grapes, nectarines, peaches, plums), vegetables, pulse, forage, beverage, and field crops; ornamentals, trees	Household use; application to buildings/structures (with arsenic and chromic acid), roofs; antifouling treatment/paint for the wooden parts, bottoms/hulls of boats
copper oxide (ic) (CCA Type-C, Wolman E, Wolmanac)	Fungicide and insecticide, including against termites; combined in some products with arsenic and chromic acid	None	Wood preservative
copper sulfate (basic) (Basicop, Cuprofix Disperss, etc.)	Antimicrobial and disinfectant; used against bacterial and fungus diseases and contamination	Ground or aerial applications in many crops including vegetables, fruits (such as grapes and wine grapes, raisins, nectarines, peaches, plums), all nut crops; trees and ornamentals; used in greenhouses	Food processing/handling facilities, households; septic/sewage systems
copper sulfate (pentahydrate) (Agritec, Bioguard, Roto Rooter Root Killer, etc.)	Antimicrobial, dessicant, and molluscicide; for controlling fungi, bacteria, algae, pond	Ground or aerial application in crops such as rice, all nut crops, fruits (including grapes and wine grapes, nectarines, peaches, plums), ornamentals; used in greenhouses,	Wood protection treatments; home/garden; used in commercial, industrial, domestic, and natural aquatic settings such as irrigation and drainage, drinking water, and

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
	weeds, snails, slugs, shrimp; root control in pipes	nurseries; animal husbandry premises; can be applied to cattle; trees/lumber	septic/sewage systems, swimming pools, coolers/condensers, toilet bowls, ponds, marshes and wetlands
cypermethrin (Ammo, Demon, Cynoff, Raid, Zep, etc.)	Insecticide; pyrethroid chemical *(see definition in notes at end of table)* used against a broad spectrum of insects and other arthropods including crop pests, ants, roaches, fleas, flies, lice, ticks, mosquitoes and termites	Ground or aerial preplant or in-crop applications to field, forage and oil crops, nuts, vegetables, cotton, ornamentals, lawns, greenhouses, beehives; farm/ag structures including animal husbandry premises; topical applications to horses for fly control; trees/forestry/lumber	Wood protection treatment; fencerows, hedgerows; home, garden, and structural pest control, including fogging; sewage/septic systems; commercial, industrial, and institutional facilities for food and nonfood storage, processing/handling, transport (all manner of vehicles), and marketing, such as hospitals, schools, restaurants; uncultivated land including rights-of-way, paved areas, refuse and solid waste sites, recreation areas
diazinon (AG-500, Diazol, Diazinon-various brands)	Insecticide and acaricide; an organophosphate chemical *(see notes at end)* that kills a broad spectrum of insects and other arthropod pests such as spiders, mites, and ticks	Ground or aerial application to a wide range of crops including grapes and wine grapes, raisins, nectarines, peaches, and plums; rangeland, pastures; nurseries, turf and lawns, ornamentals; almond hulls; farm and animal husbandry premises, farm animals (including cattle ear tags), beehives; forests	Products sold in 2004 and earlier were for domestic dwellings and other buildings and structures; refuse and solid waste sites; rights-of-way, recreational and uncultivated land; aquatic settings including irrigation and drainage systems. **Starting in 2005, all residential products are phased out and only products for outdoor agricultural use may be sold. Existing stocks labeled for**

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
			other purposes may be used indefinitely.
1,3-dichloropropene (Inline, Telone, Tri-Cal, Pic-Clor, etc.)	Soil fumigant; combined with chloropicrin in many products; used for nematode, disease, and insect control	Applications to soil before planting of many crops, such as fruits (including grapes and wine grapes, nectarines, peaches, plums), vegetables, nuts, cotton, ornamentals; used in nurseries, pasture; forestry	None
dicofol (Kelthane)	Acaricide; organochlorine chemical *(see definition in notes at end of tables)* used against mites	Ground or aerial application in selected crops such as cotton, vegetables, nuts, and fruits (including grapes, wine grapes), turf/lawns, ornamental trees; used in gardens, nurseries	Buildings and structures
dimethoate (Cygon, De-Fend, Digon, Prozap, Dimethoate-various brands)	Insecticide and acaricide; Organophosphate chemical *(see notes at end)* effective against a broad spectrum of insect and arthropod pests including flies, mosquitoes, cockroaches, ticks, lice	Ground or aerial application to many crops such as cotton, vegetables, fruits (including grapes, wine grapes, and raisins), ornamentals; nurseries, fallow areas, manure; livestock and poultry; farm/agricultural structures including animal husbandry premises; trees/forestry	Used in household, commercial, and institutional settings including storage and transport facilities, food processing/handling; uncultivated land, refuse and solid waste sites, recreational areas
diuron (Direx, Karmex, etc.)	Algaecide and defoliant; substituted urea chemical effective against algae including pool scum	Ground or aerial applications preplant or in-crop on forage and field crops, olives, ornamentals, cotton, grains, vegetables, and fruit including grapes, wine grapes, and	Used in commercial, industrial, and institutional settings such as airports and runways, buildings and structures, storage and processing areas, rights-of-way and

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
		peaches; applied as a defoliant for cotton, carrots, and onions; used on fallow land, pastures, farm and animal husbandry premises; lumber	other uncultivated land; in aquatic sites such as aquaria, ponds, lakes and reservoirs, drainage and irrigation systems; preservative for adhesives, paint, and coatings
endosulfan (Thiodan, Phaser, Thionex, Endosulfan-various brands)	Insecticide and acaricide; organochlorine chemical *(see notes at end)* used against a wide range of insect and mite pests	Ground or aerial use in many crops such as cotton, nuts, vegetables, forage crops, ornamentals, and fruits including grapes and wine grapes, nectarines, peaches, and plums; greenhouses, nurseries, gardens; trees/forestry	None
EPTC (Eptam, etc.)	Herbicide; for control of grasses and broadleaf weeds	Ground or aerial application in forage and field crops, nut crops, citrus, potatoes, tomatoes, corn; pine trees; no reported use in the Parlier area during the last five years	None
iprodione (Rovral, Chipco, etc.)	Fungicide; for controlling plant diseases	Ground or aerial applications against many diseases of fruits (including grapes and wine grapes, raisins, nectarines, peaches, plums), nuts, vegetables, cotton, cereals, field crops, oil crops, trees, turf; ornamentals; used in greenhouses and for landscape maintenance	Applied in commercial, institutional, and industrial settings, recreational areas (golf courses)
malathion (Malathion-various brands, Fyfanon, Mosquito B Gon, etc.),.	Insecticide and acaricide; organophosphate chemical *(see notes at end)* effective against a	Ground or aerial preplant or in-crop applications to many crops including grapes and wine grapes, raisins, nectarines, peaches, and plums; also seeds, ornamentals, turf and lawns,	Rights-of-way and other uncultivated land; home and garden; structural, institutional, industrial, and commercial use in rural and urban settings, such as

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
	broad spectrum of indoor and outdoor pests including ants, fleas, cockroaches, mosquitoes, wasps, lice and ticks	nonliving plant material; used in quarantine facilities, nurseries, greenhouses, rangeland and pastures, on livestock, poultry, and pets, and in animal husbandry premises; trees and forestry, lumber	food/feed processing/handling, storage, and marketing facilities, restaurants, schools (indoor) and other buildings and structures; applied to refuse and solid waste sites, and to marshland and aquatic sites for mosquito abatement; added to wood preservatives, coatings, and paint
metam-sodium [MITC] (Metam, Busan, Nemasol, Sectagon 42, Vapam, etc.)	Fumigant; used to kill fungal and bacterial diseases, arthropod pests (insects, mites, shrimp), nematodes, and broadleaf and grassy weeds	Applied to soil before planting; all agricultural crops, ornamentals; forests/lumber	Wood protection treatment; all-purpose fumigant, including for wood structures; water applications such as sewage and waste water systems, aquatic areas
methyl bromide (Methyl Bromide-various brands, Brom-O-Gas, Terr-O-Gas, Metabrom, MBR, Pic-Brom, Tri-Com, etc.)	Soil, space and commodity fumigant; combined with chloropicrin in many products; for control of diseases, insects and other arthropod pests, nematodes, snails and slugs, rodents and other mammalian pests, broadleaf weeds and grasses	Applications to soil before planting of ornamental and agricultural crops and turf; used in nurseries and greenhouses, with nonliving plant material, for pre-shipment quarantine, and for disinfection of agricultural equipment, animal husbandry premises and beehives; forestry/lumber **Under an international treaty, the Federal government allows only certain "critical uses" for products manufactured or imported starting January 1, 2005.**	Used in recreational (golf courses), commercial, industrial, institutional, structural, and uncultivated settings; fumigation chambers, storage and transport facilities, food and nonfood processing and manufacturing, restaurants, public buildings, domestic dwellings; water disinfection

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
molinate (Ordram)	Herbicide; for control of watergrass	Ground or aerial application to rice; almost no reported use in the Parlier area	None
naled (Dibrom, Naled-various brands, Fly Killer D, Legion, Trumpet)	Insecticide and acaricide; organophosphate chemical *(see notes at end)* effective against a broad spectrum of arthropod pests including insects and mites	Ground or aerial applications in pastures, rangeland, and many crops including forage, fodder, and pulse crops, rice, cotton, vegetables, fruits, nuts, ornamentals, turf; animal husbandry premises; trees/forests	Used in a wide range of household, commercial, and institutional settings including food processing/handling facilities, restaurants; uncultivated areas such as refuse and solid waste sites, rights-of-way; municipal and other large-area mosquito control
oxyfluorfen (Goal, Galigan, FirePower, etc.)	Herbicide; diphenyl ether chemical for preemergence and/or postemergence control of certain annual broadleaf and grassy weeds	Ground or aerial application in many crops such as cotton, nuts, vegetables, fruits (including grapes, wine grapes, raisins, nectarines, peaches, plums); ornamentals, turf/lawns; farm/ag structures; trees/forestry	Fencerows, hedgerows; also used in household, structural, commercial, institutional, and industrial settings such as storage areas, airports and landing fields, rights-of-way, and other paved or uncultivated land
permethrin (Pounce, Ambush, etc.)	Insecticide; pyrethroid chemical *(see notes at end)* for control of a broad spectrum of insect and arthropod pests including crop pests and ants, cockroaches, mosquitoes, wasps, fleas, ticks, lice, mites, spiders and termites	Ground or aerial preplant or in-crop applications for all fruits and nuts, forage, oil, and field crops, cotton, vegetables, herbs, ornamentals, turf/lawns, greenhouses; also applied to pets, livestock, and animal husbandry premises; trees/forestry	Applied as an insect repellant; also home and garden, structural, area fogging, and aquatic uses

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
phosmet (Imidan)	Insecticide; organophosphate chemical *(see notes at end)* used against a broad spectrum of crop pests, as well as ticks, lice, and other veterinary pests	Ground or aerial application in fruits (including grapes and wine grapes, nectarines, peaches, plums), nut crops, forage crops, cotton, field crops, ornamentals; parasite control on cattle and pigs; forests	Used in household/domestic settings and for recreational areas, rights-of-way, uncultivated land
propanil (Duet, Stam, Wham, Super Wham)	Herbicide; anilide chemical for control of aquatic weeds, broadleaf weeds, and grasses	Postemergence ground/aerial applications in rice; no reported use in the Parlier area	None
propargite (Comite, Omite)	Acaricide; sulfite ester chemical used to control mites	Ground or aerial application to a broad range of crops such as cotton, vegetables, nuts, ornamentals, and fruits including nectarines, peaches, plums, grapes and wine grapes, raisins; forest trees; reported use of Comite is negligible in the Parlier area; reported use of Omite has been declining, to about 3,500 ac in 2004	None
(S)-metolachlor (Pennant, Bicep, or Dual Magnum; Medal)	Herbicide; chloroacetamide chemical for weed control	Ground or aerial application in selected crops including cotton, field and pulse crops, vegetables, fruits; tree nurseries, turf, ornamentals, landscape plantings; reported use rare in the Parlier area	Rights-of-way, recreational areas, airports and landing fields
S,S,S-tributyl phosphorotrithioate	Defoliant; organophosphate	Ground or aerial spray application to cotton; no reported use in Parlier	None

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
[tribufos] (Def, Folex)	chemical *(see notes at end)* used to remove leaves from the crop		
simazine (Princep, Sim-Trol, Simazine-various brands, Aquazine, etc.)	Herbicide and algaecide; Triazine chemical for control of most annual grasses and broadleaf weeds	Ground or aerial applications in forage and field crops, olives, carob, nuts, fruit (including grapes and wine grapes, nectarines, peaches, plums), vegetables, ornamentals and nurseries, turf/lawns and sod farm/ag structures and animal husbandry premises; trees/lumber/forestry	Fencerows and shelterbelt plantings; golf courses; uncultivated areas such as rights-of-way; also used in structural, industrial, and aquatic settings
sodium tetrathiocarbonate [CS2] (Enzone, ETK-1101)	Fumigant, or liquid applied to soil; used against fungi, nematodes, and insect pests	Preplant or postharvest use in fruit (including grapes and wine grapes, peaches, plums), nut crops, and roses; often applied through irrigation systems	None
sulfur (Thiosperse, Thiolux, Thioben, Yellow Jacket, Super Six, Kumulus, Microthiol, sulfur dust-various brands, copper-sulfur dust, etc.)	Acaricide, insecticide, antimicrobial, and soil amendment; used against insect and mite pests, fungal and bacterial plant diseases; also in smoke briquets or baits deployed for control of rodents and other mammal pests	Ground or aerial application on a wide range of crops such as vegetables, fruits (including grapes and wine grapes, raisins, nectarines, peaches, plums), cotton, grains, pulses, forage/fodder crops, all field and nut crops; ornamentals, turf, trees; used in lawns, gardens, greenhouses, pastures, rangelands; applied to dogs and horses against mange	Uncultivated land including rights-of-way; recreational areas (such as golf courses); in paint/wood preservatives
thiobencarb (Abolish, Bolero)	Herbicide; for control of aquatic weeds and grasses	Ground or aerial preplant or in-crop application to transplanted and direct-seeded rice fields; no reported	None

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
		use in the Parlier area	
trifluralin (Treflan, Triap, Trilin, etc.)	Herbicide and growth inhibitor; dinitroaniline chemical for controlling broadleaf and grass weeds	Ground or aerial preplant or in-crop use for many crops such as cotton, nuts, vegetables, and fruits including grapes and wine grapes, raisins, nectarines, peaches, plums; ornamentals, turf/lawns, nursery equipment, greenhouses; trees/forestry/lumber; reportedly applied to about 250-500 ac/yr in the Parlier area	Home and garden; structural, industrial, and uncultivated area applications including pavements, rights-of-way, sewage disposal sites, and recreational areas (golf courses)

Table 2: Additional pesticides that may be included in DPR's Environmental Justice Pilot Project

Agricultural uses emphasize Parlier area pesticide use patterns. Nonagricultural uses listed are those allowed by California product labels. [Also please see the notes which follow these tables]

COMMON NAME (COMMERICAL NAMES)	ACTION / TARGET PESTS	PARLIER AREA AGRICULTURAL USES	LABELED NONAGRICULTURAL USES
chloropicrin (Tri-Clor, Chlor-O-Pic, Metapicrin, Nutrapic)	Fumigant; combined in many products as a warning agent with odorless fumigants methyl bromide and 1,3 dichloropropene; controls bacteria, fungi, arthropods (insects, mites, ticks), nematodes, snails, slugs, and weeds	Preplant application in all agricultural crops, ornamentals, turf; also applied in greenhouses and nurseries, to nonliving plant material, and on uncultivated agricultural land; trees/forestry/lumber	All types of nonagricultural fumigation (buildings and structures, food and nonfood processing/handling, manufacturing, commercial and institutional storage, transport, and water systems)
chlorothalonil (Bravo, Busan, Daconil, Echo, etc.)	Fungicide and antimicrobial; used against fungi, bacteria, algae	Ground or aerial application to fruit (all orchards, grapes and wine grapes), beans and peas, peanuts, herbs, mushrooms, all vegetables and nuts; ornamentals, turf, grass grown for seed; used in greenhouses and nurseries; trees/forestry/lumber	Recreational areas (tennis courts, golf courses); industrial preservative (resin, adhesives, paints and coatings); wood protection treatment, including structures
2,4-D, dimethylamine salt (Banuel, Dri-Clean, Weedar, Weed Master, Weedaxe, Saber, etc.)	Herbicide, growth regulator in citrus; chlorinated phenoxy chemical for the control of broadleaf weeds, including aquatic weeds	Ground or aerial preplant or in-crop applications to fruits (including all orchards, grapes and wine grapes), forage/fodder crops, corn, sugarcane, all nuts and grains, ornamentals, turf/lawns, grasses grown for seed, pastures and	Fencerows, hedgerows, rights-of-way, uncultivated ag and non-ag land, wasteland; natural and artificial aquatic sites, swamps, marshes, irrigation and drainage systems; urban, commercial, institutional, and industrial uses including paved areas

		rangeland, hay silage; landscape maintenance, gardens/mulch; farm/ag structures; trees/forestry/lumber	(airports and landing fields), storage and recreational sites (tennis courts, golf courses); buildings and structures including homes

Notes

Preplant or in-crop application—At least one product containing that active ingredient is labeled for preplant application, and at least one product is labeled for in-crop application.

Ground or aerial application—At least one product containing that active ingredient is labeled for ground application, and at least one product is labeled for aerial application.

Crops—If at least one product containing that active ingredient is labeled for use on cotton or on Parlier's major crops—grapes, wine grapes, raisins, nectarines, peaches, plums—the table mentions the crop specifically, or by saying "all fruits," or "all orchards." **Crop categories:** If a category such as "field crops" is mentioned, it means that at least one product containing that active ingredient is labeled for use on at least one crop in the category. **Glossary:** "**pulse crops**" include peanuts and various types of peas and beans; "**field crops**" refers to certain crops grown on large areas, such as corn and sugar beets; "**forage/fodder crops**" such as alfalfa and clover are grown for animal food; "**oil crops**" like canola and safflower are grown primarily for extracting oils; "**beverage crops**" includes, for instance, coffee.

Chemicals—Organophosphates are a group of closely related pesticides that affect functioning of the nervous system. They are usually short-lived in the environment, but include some of the most toxic pesticides used in agriculture and can be hazardous to applicators and others who are over-exposed. **Pyrethroids** are a large class of synthetic insecticides produced to duplicate or improve on the natural insecticide produced by chrysanthemum flowers. In California, pyrethroids are often used on fruit and nut trees, field crops, rice, nurseries, and urban landscapes. Surface water runoff and pesticide drift during application can result in contamination and subsequent accumulation in sediment of adjacent waterways. **Organochlorines** (also known as chlorinated hydrocarbons) are a chemically related class of pesticides that contain a high percentage of chlorine. Most organochlorine insecticides were banned or severely restricted because of their carcinogenicity, tendency to persist in the environment and to bioaccumulate (accumulate in the body fat of humans and other animals), and toxicity to wildlife. The best-known organochlorine insecticide was DDT, which was banned more than 30 years ago.

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ATTACHMENT IV – OVERVIEW OF POSSIBLE HEATH EFFECTS AND SCREENING LEVELS FOR MONITORED PESTICIDES

DESCRIPTION OF POSSIBLE HEALTH EFFECTS

The description of the major toxic effects that may be associated with overexposure to the pesticides that are included in the project are listed below with the screening levels. Some of these effects were identified in animal studies and some have been identified from human exposure incidents. This is only intended to be a brief overview of each pesticide and is not intended to be a detailed toxicity profile of each pesticide.

METHODS FOR DERIVING SCREENING LEVELS

The screening levels are based on identified critical toxicology values or exposure levels taken from existing documents that have already been subject to peer review and, in some cases, public comment. The three primary sources are risk assessments, in the form of Risk Characterization Documents (RCDs) conducted by DPR, Reregistration Eligibility Documents (REDs) completed by USEPA, and Reference Exposure Levels (RELs) established by OEHHA and peer reviewed by the Toxic Air Contaminant (TAC) Scientific Review Panel. In some cases, information from the USEPA Integrated Risk Information System (IRIS) is used for cancer potency values.

In 1996, Congress passed major pesticide food safety legislation. This legislation, titled the Food Quality Protection Act of 1996 (FQPA) made significant changes to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Food, Drug, and Cosmetic Act (FFDCA). Among other provisions, FQPA requires USEPA to review existing pesticide food tolerances and to include an additional tenfold "safety factor" to account for uncertainty in data relative to children, unless reliable data show that a different factor will be safe. This additional factor has become known as the "FQPA factor" or "FQPA safety factor." USEPA establishes the FQPA factor for a pesticide in the course of preparing the RED for that chemical. USEPA generally sets the factor at 1X, 3X, or 10X, depending on the completeness and reliability of the data available to assess pre or post-natal toxicity and depending on the potential for pre or post-natal effects of concern. The screening levels derived below do not incorporate the FQPA safety factor to avoid confusion in evaluating multiple pesticide/chemical exposure; however, the factors are presented and will be considered in evaluating the measured air levels of the individual pesticides.

Acute toxicity can be defined as the toxicity manifested within a relatively short time interval, generally not longer than one day. In this document, unless specifically noted, acute screening levels are for 24 hours. Subchronic toxicity can be defined as the toxicity manifested within a more extended interval, but not one that constitutes a significant portion of the lifespan of the species in question. In subchronic toxicity testing using mammalian test species, the period of exposure is generally 30 to 90 days. Chronic toxicity is manifested over a long-term period, generally for a significant portion of a lifetime.

One quantitative descriptor of the results of a toxicity study is the No Observed Adverse Effect Level (NOAEL). The NOAEL can be defined as the highest dose level of a chemical (in this case, a pesticide) that causes no observable adverse or toxic effect in the animal test species in the study. A related term, the Lowest Observed Adverse Effect

Level (LOAEL), can be defined as the lowest dose of a chemical that still causes an observable adverse or toxic effect. In some cases, a study will demonstrate adverse effects at all dose levels, and a NOAEL will not be readily apparent. In these situations, applying an uncertainty factor (generally 10-fold or less) to the LOAEL can generate an Estimated No Observed Adverse Effect Level.

Two other terms that need to be defined are Reference Dose (RfD) and Reference Concentration (RfC). The RfD is an estimate of the daily exposure of the human population to a chemical, usually by the oral route, that is likely to be without adverse effects. The RfC is an estimate of the daily air concentration of a chemical that is likely to be without adverse effects to the exposed human population. RfCs and RfDs are derived by applying the appropriate uncertainty factors to the appropriate NOAEL. In deriving a RfD or RfC from a NOAEL from an animal study, the standard practice is to apply a default uncertainty factor of 100 (to extrapolate from the results of an animal study to an estimated safe level for humans). This factor of 100 is derived from a factor of 10 to account for the uncertainty in extrapolating from animals to humans and an uncertainty factor of 10 to account for variability in the human population. The presence of additional data or information may support the use of alternate factors.

Children have the highest inhalation rate relative to body weight; therefore, they would inhale the highest amount of airborne material relative to their body weight. Since the screening levels are being used to evaluate ambient air levels, it is appropriate that health protective values are used, and the screening levels will be based on children less than one year of age. Unless otherwise stated, this document uses a default inhalation rate for a child less than one year of age of $4.5 m^3$/day and a default body weight of 7.6 kg.

The respiratory rate is then calculated as:

$$(4.5 m^3/day)/(7.6 kg) = 0.59\ m^3/kg/day$$

The toxicology database for a pesticide contains a series of toxicity studies. The particular study and corresponding NOAEL that is selected as the basis for the risk calculations or screening level derivations can be described as the “critical” study or NOAEL. Inhalation NOAELs are generally derived from studies using laboratory animals, frequently the rat, and are usually expressed in terms of an air concentration. Since these animals have different respiratory rates from humans, which would result in different amounts of material being inhaled, it is DPR’s practice to convert an inhalation NOAEL from an animal study to a human equivalent level to account for the differences in respiratory rates. It should be noted that this adjustment does not factor in differences in toxicologic sensitivity. This potential differential sensitivity is taken into account in the application of uncertainty factors.

To convert an inhalation NOAEL to the human equivalent NOAEL, DPR uses the equation:

Animal NOAEL x (animal resp. rate/human resp. rate) = human equivalent NOAEL

For the rat, the DPR default respiratory rate is 0.96 m^3/kg/day, and the above equation

becomes:

Rat NOAEL x (0.96m^3/kg/day)/(0.59m^3/kg/day) = human equivalent NOAEL

Rat NOAEL x 1.6 = human equivalent NOAEL

OEHHA commented that it does not use the conversion from rat NOAEL to human equivalent NOAEL (rat NOAEL x 1.6 = human equivalent NOAEL). OEHHA states that this in effect says that once the material in inhaled, the absorption characteristics of the respiratory systems between the two species are equivalent and that humans are less sensitive (have higher NOAELs) than rats. OEHHA does not believe that either assumption is necessarily or universally true and suggests that the conversion is not used, at least for screening purposes. However, DPR continues to believe that it is scientifically appropriate to account for differences in breathing rates.

For logistical reasons, if the period of exposure in the animals study is for less than a full 24-hour period, the resulting NOAEL is usually normalized to a 24-hour period. In general, rat inhalation NOAELs are derived from studies of either 4 or 6 hours out of 24 hours. In cases where an inhalation NOAEL is derived from such a study, it is the accepted practice to normalize the NOAEL to 24 hours by multiplying the experimental NOAEL by either (4/24) or (6/24) to calculate an equivalent 24-hour NOAEL. Subchronic or chronic inhalation studies are often conducted for 5 days per week, and the results are normalized to a 7-day week by multiplying the NOAEL by (5/7) to calculate an equivalent NOAEL for exposure throughout the 7-day week.

Often, inhalation studies are not available for a particular chemical. In these cases, the results from oral studies are used. However, the oral NOAEL (or the RfD) must be converted to an inhalation NOAEL (or the RfC). This conversion calculates the air concentration that would result in the subject taking in the same amount of chemical as would be taken in orally. To convert an oral NOAEL or RfD to an inhalation NOAEL or RfC, DPR uses the equation:

RfC (or screening level) = RfD x body weight of subject/ inhalation rate

For the above child:

RfC or screening level (mg/m^3) = RfD (mg/kg/day) x (7.6kg)/(4.5 m^3/day)= 1.7 RfD

OVERVIEW OF POSSIBLE HEATH EFFECTS FROM PESTICIDES AND SCREENING LEVELS

Acrolein

Acrolein is a liquid with a pungent odor that readily dissolves in water and evaporates rapidly from water and soil. It is used as an herbicide in aquatic areas and irrigation systems. It is an acute respiratory and eye irritant and sufficiently high exposures can

result in death. More prolonged exposures in animal studies have resulted in nasal and respiratory damage.

DPR has prioritized acrolein for risk assessment initiation and USEPA has scheduled an RED on acrolein for release in 2006. Acrolein has extensive non-pesticidal (industrial) uses. OEHHA has set acute and chronic RELs for acrolein as part of the Air Toxic Hot Spots Program.

To address chronic exposure, OEHHA used a LOAEL of 400 ppb (920 ug/m^3) for upper respiratory tract lesions in a rat subchronic inhalation study in which rats were exposed 6 hours a day, 5 days a week. This was extrapolated to a continuous exposure of 71 ppb (160 ug/m^3). OEHHA addressed differences in breathing rates, applied an uncertainty factor of 3 to address using a LOAEL instead of a NOAEL, applied an uncertainty factor of 3 to address using a subchronic study to derive a chronic value, an uncertainty factor of 3 to address interspecies variability, and applied a factor of 10 to address intraspecies variability in order to derive a chronic REL of 0.03 ppb (0.06 ug/m^3). This chronic REL is used as the chronic screening level. Removing the uncertainty factor of 3 for using a subchronic study (to derive a chronic value) would result in a subchronic screening level of 0.09 ppb (0.18 ug/m^3).

OEHHA derived an acute 1-hour LOAEL of 5 ppb based on eye irritation in human volunteers. OEHHA extrapolated the 1-hour LOAEL from the 5-minute LOAEL of 60 ppb using the equation, $C^n \times T = K$ (a constant), where n=1. OEHHA then applied a factor of 6 to address the uncertainty of deriving a NOAEL from a LOAEL and an uncertainty factor of 10 to address the uncertainty of intraspecies variability. The resulting 1-hour REL is 0.09 ppb (0.19 ug/m^3). Using the above equation, one can calculate a 24-hour LOAEL of 0.2 ppb and a resulting 24-hour level of 0.0035 ppb (0.0079 ug/m^3). However, extrapolating, in effect, from 5 minutes to 24 hours introduces a great deal of uncertainty, especially for an irritative effect. This is supported by the observance that the 24-hour extrapolated acute value is less than the subchronic and chronic values. In this case, it is more appropriate to use the 1-hour value (0.19 ug/m^3) as the acute screening value, rather than the extrapolated 24-hour value. OEHHA is currently in the process of reevaluating the acute NOEL for acrolein.

The IRIS toxicology review for acrolein states that the data are not sufficient for a carcinogenicity classification.

Arsenic

OEHHA has set acute and chronic RELs for arsenic as part of the Air Toxic Hot Spots Program. Both the acute and chronic RELs were set based on the results of a developmental toxicity study in mice using arsenic trioxide. In the study, mice were exposed by inhalation to arsenic trioxide for four hours on gestation days 9 through 12. All values are expressed in terms of arsenic alone. The LOAEL was 0.19 mg/m^3 for developmental effects. OEHHA applied an uncertainty factor of 10 to address using a LOAEL instead of a NOAEL, an uncertainty factor of 10 to address interspecies uncertainty, and a factor of 10 to address intraspecies uncertainty in order to derive an acute 4-hour REL of 0.19 ug/m^3. This value is multiplied by 4/24 to derive a 24-hour hour acute screening level of 0.03 ug/m^3. OEHHA used the same study to derive a

chronic REL of 0.03 ug/m^3. This value will be used for the chronic and subchronic screening levels.

Arsenic is a known human carcinogen. As part of Air Toxic Hot Spots Program, OEHHA list carcinogenic potency of arsenic as 12 $(mg/kg\text{-}day)^{-1}$.

Azinphos-methyl

Azinphos–methyl, chloropyrifos, diazinon, dimethoate, malathion, naled, phosmet, and S,S,S-tributyl phosphorotrithioate (DEF) all belong to a class of insecticides known as organophosphates (OPs). These insecticides kill insects by direct contact or ingestion by disrupting their normal nervous system functions. They interfere with the acetylcholinesterase enzyme that is necessary for normal nerve transmission. Signs and symptoms associated with OP poisoning in humans include headache, nervousness, blurred vision, weakness, nausea, diarrhea, difficulty breathing, sweating, pin-point pupils, tearing, salivation muscle twitching, muscle weakness, and in severe poisonings convulsions, coma, and death. Severe, acute organophosphate poisoning may rarely be associated with chronic neurological effects. A blood test can document acute OP exposure.

In 2001, USEPA released an Interim Reregistration Eligibility Document (IRED) on azinphos-methyl. In this document, USEPA stated that the results of a 90-day rat inhalation study (6 hours per day, 5 days per week) should be used to assess inhalation of any time period. This study had a NOAEL of 1.2 mg/m^3 for the inhibition of plasma and red blood cell cholinesterase. This would be equivalent to a human NOAEL of 2 mg/m^3 for 6 hours and 0.5 mg/m^3 for 24 hours. Applying an uncertainty factor of 10 to address interspecies uncertainty and a factor of 10 to address intraspecies uncertainty would result in an acute screening level of 5 ug/m^3. Adjusting for exposure for 5/7 days results in subchronic and chronic screening levels of 3.5 ug/m^3. USEPA did not retain the FQPA safety factor.

DPR completed a revised RCD on azinphos-methyl in 2004. The RCD used an acute NOAEL of 0.75 mg/kg, established for inhibition of blood cholinesterase in a single dose oral study in adult human volunteers. This NOAEL was similar to the NOAELs in animal studies, suggesting that humans were not more sensitive than animals. The RCD used a daily respiration rate 0.74 m^3/kg/day, and an uncertainty factor of 10 for intraspecies variation to arrive at an acute RfC of 101 ug/m^3. The RCD used a subchronic NOAEL of 0.25 mg/kg/day, established for inhibition of blood cholinesterase in a 28-day oral study in adult male human volunteers. Again, this NOAEL was similar to subchronic NOAELs from animal studies. The RCD used a daily respiration rate of 0.74 m^3/kg/day, an uncertainty factor of 3 to address the fact that only males were used in the study, and an uncertainty factor of 10 for intraspecies variation to arrive at a subchronic RfC of 11 ug/m^3. The lowest NOAEL established in a chronic study was 0.15 mg/kg/day for clinical signs and red blood cell cholinesterase inhibition in an oral dog study. The RCD used this NOAEL, an uncertainty factor of 10 for intraspecies variation, and an uncertainty factor of 3 for interspecies variation to derive a chronic RfC of 6.8 ug/m^3. The uncertainty factor of 3 for interspecies variation was used, since the results of the subchronic human study suggested that humans were not more sensitive than animals.

Measured air levels of azinphos-methyl will be compared the DPR derived screening levels. However, since the screening levels will be used to help decide if there is a need for further evaluation of measured air levels, rather than to take specific regulatory or mitigation action, USEPA derived levels will also be part of the consideration.

USEPA classifies azinphos-methyl as not likely to be carcinogenic to humans.

Carbon disulfide

Sodium tetrathiocarbonate is applied to the soil, but converts to **carbon disulfide**, sodium hydroxide, hydrogen sulfide, and sulfur in the soil. Hydrogen sulfide and carbon disulfide are released to the air and can move offsite. Carbon disulfide is the pesticidal active ingredient. Hydrogen sulfide has a strong odor and can cause irritation of the eye nose, throat, and exposed body surfaces; nausea; neurological effects; pulmonary edema; and death. A primary toxicological target of carbon disulfide is the nervous system. Toxicity in humans following acute inhalation exposure to very high concentrations of carbon disulfide usually includes symptoms similar to inebriation and a loss of tendon reflexes. Death may occur from respiratory depression. Other symptoms include disorientation, headache, nausea, dizziness, fatigue, heart disturbances, and hallucinations. Longer-term exposures of humans to lower concentrations have resulted in symptoms including polyneuritis, psychoses, gastric disturbances, headaches, impotence, tremors, sleep disturbances, and myopathy. Carbon disulfide also causes reproductive toxicity and has been listed under Proposition 65 as reproductive and developmental toxicant.

Carbon disulfide is also generated by the breakdown of metam sodium into MITC (methyl isothiocyanate). This screening level is set for carbon disulfide.

Carbon disulfide has extensive not-pesticidal uses and exposure sources. OEHHA has set acute and chronic RELs for carbon disulfide as part of the air Toxic Hotspots Program. OEHHA set an acute 6-hour REL of 6,200 ug/m^3 based on a rat inhalation developmental toxicity study. In this study, rats were exposed for 6 hours a day for gestation days 6-20. The NOAEL was 620 mg/m^3 for decreased fetal body weight. OEHHA applied an uncertainty factor of 10 to address interspecies variability and a factor of 10 to address intraspecies variability. The REL does not incorporate a factor to compensate for differences in breathing rates between rats and people. The 6-hour REL of 6,200 ug/m^3 can be multiplied by 6/24 to derive a 24-hour screening level of 1,550 ug/m^3.

OEHHA set a chronic REL of 800 ug/m3 based on a study that evaluated people occupationally exposed (8-hour work day) to carbon disulfide. This study established an average LOAEL of 7.6 ppm for decreased nerve conduction. OEHHA used a benchmark concentration (BMC) and compensated for 24-hour exposure to establish a human equivalent concentration of 2.54 ppm. An uncertainty factor of 10 to account for intraspecies variation was applied, resulting in a REL of 0.254 ppm. OEHHA rounded this to 0.3 ppm (800 ug/m^3). 800 ug/m^3 will be used as the subchronic and chronic screening levels.

Chlorothalonil

USEPA completed an RED on chlorothalonil in 1999. The RED addressed inhalation for

all time periods with a NOAEL of 2 mg/kg (kidney toxicity, forestomach ulcers) in a two-year oral rat study, assuming 100% absorption. Using this NOAEL and a combined uncertainty factor of 100 (a factor of 10 to address interspecies variability and a factor of 10 to address intraspecies variability) results in a screening level of 34 ug/m^3 for all time periods. USEPA assigned a FQPA safety factor of 1X. USEPA classified chlorothalonil as likely to be a human carcinogen by all routes of exposure (based on rat kidney tumors) and calculated a potency factor of 0.00766 $(mg/kg/day)^{-1}$. The RED uses both a potency factor and RfD approach for assessing carcinogenicity.

DPR completed a dietary RCD on chlorothalonil in 2004, which calculated a potency factor of 0.011 $(mg/kg/day)^{-1}$ for kidney tumors. This slightly higher potency factor will be used in this analysis. Since the RCD is limited to dietary exposure, inhalation was not included. Inhalation exposure will be evaluated in a comprehensive risk assessment (evaluates all routes of exposure and exposure scenarios) whose completion is pending completion of the non-dietary exposure analysis. The completion of this risk assessment could result in changes to the above screening levels.

Chlorpyrifos

Chloropyrifos belongs to the same class of organophosphates (OPs) insecticides as **azinphos–methyl**. The health effects are the same as described for azinphos-methyl.

USEPA completed an IRED on chlorpyrifos in 2001. The IRED addressed short-term and intermediate-term inhalation using the same subchronic rat inhalation study. Rats were exposed 6 hours per day, 5 days per week. The highest dose level was 297 ug/m^3, and no effects were seen at any dose level, making 297 ug/m^3 a health protective NOAEL. For an acute screening level, the 297 ug/m^3 is adjusted by 6/24 to give a 24 hour NOAEL of 74 ug/m^3 and a screening level of 1.2 ug/m^3 (employs uncertainty factors of 10 each for inter and intraspecies uncertainty and corrects for differences in breathing rates). For the subchronic screening level, the value is adjusted by 5/7 to compensate for the 5 day out of 7-day exposure, leading to a screening level of 0.85 ug/m^3. For chronic exposure, the IRED used a chronic oral dog study with a NOAEL 0.03 mg/kg for cholinesterase inhibition. This leads to an RfD of 0.0003 mg/kg and a screening level of 0.51 ug/m^3. USEPA retained the FQPA safety factor of 10X.

USEPA has assigned chlorpyrifos an “E” carcinogenicity classification, evidence of non-carcinogenicity.

Copper

OEHHA set an acute REL for copper based on the effects reported in an evaluation of occupationally exposed persons. The NOEL was set at 1 mg copper/m^3 for “metal fume fever.” Inhaled copper also causes upper respiratory irritation. OEHHA applied an uncertainty factor of 10 to account for intraspecies variation and established an acute REL of 100 ug/m^3. This value will be used as the acute screening level. The majority of the toxicity information on copper revolves around oral exposure, not inhalation exposure, but it appears that the toxicity profile differs considerably, depending on the route of exposure. In this situation, it would be inappropriate to use oral data as the basis for generating subchronic or chronic screening levels. Applying a default uncertainty factor of 10 to the acute screening level results in a level of 10 ug/m^3. This value will be

used as the subchronic and chronic screening levels.

USEPA has assigned copper a "D" carcinogenicity classification (insufficient data for classification).

Cypermethrin

Cypermethrin and permethrin belong to a class of insecticides called pyrethroids. Pyrethroids are synthetic forms of pyrethrins, which is an insecticide derived from an extract of chrysanthemum flowers. Pyrethroids act as contact poisons and affect the nervous system by interfering with the transmission of nerve impulses. Even though they are nerve poisons, they do not inhibit the cholinesterase enzyme, as do the organophosphates and carbamates. A large amount of pyrethroids on the skin can result in feelings of numbness, itching, burning, stinging, tingling, or warmth that could last for a few hours. Large amounts of these chemicals entering the body (through the skin, by inhalation, or orally) could result in dizziness, headache and nausea that might last several hours. Larger amounts could cause muscle twitching, reduced energy, loss of awareness, convulsions, and loss of conspicuousness. Allergic reactions have been seen in some individuals. Animal studies involving lifetime oral exposure to large amounts give some evidence of cancer.

USEPA is scheduled to complete an RED on Cypermethrin in 2006. In 2001, USEPA published a notice in the Federal Register establishing permanent tolerances for cypermethrin and zeta-cypermethrin. This notice contained a risk assessment of cypermethrin and stated that the NOAEL of 0.01 mg/L (10 mg/m^3) for body weight decrease in a 21-day subchronic inhalation study in rats should be used to assess inhalation exposure scenarios of all durations. The notice also stated that an additional uncertainty factor of 3X should be applied to the subchronic NOAEL to estimate a chronic inhalation NOAEL. In the study, exposure occurred 6 hours a day, 5 days a week. To estimate an acute 24-hour NOAEL, 10 mg/m^3 is adjusted by 6/24, resulting in a NOAEL of 2.5 mg/m^3. An adjustment of 5/7 results in a subchronic NOAEL of 1.8 mg/m^3 for exposure 7 days a week. The application of the previously mentioned uncertainty factor of 3X results in a chronic NOAEL of 0.6 mg/m^3. Applying a correction factor of 1.6 to the NOAELs results in human equivalent acute, subchronic, and chronic NOAELs of 4.0 mg/m^3, 2.9 mg/m^3, and 0.96 mg/m^3, respectively. Applying an uncertainty factor of 10 for interspecies variation and 10 for intraspecies variation results in acute, subchronic, and chronic screening levels of 40 ug/m^3, 29 ug/m^3, and 9.6 ug/m^3, respectively. USEPA assigned a FQPA safety factor of 1X.

USEPA has assigned cypermethrin a "C" carcinogenicity classification (possible human carcinogen) but did not derive a cancer potency value.

Diazinon

Diazinon belongs to the same class of organophosphates (OPs) insecticides as **azinphos–methyl**. The health effects are the same as described for azinphos-methyl.

The values for these screening levels were taken from a USEPA IRED released in 2004. In this document, USEPA determined that inhalation for all time periods should be evaluated using a 21-day rat inhalation study. The study used inhalation exposures of 6

hours per day, 7 days a week for 21 days. The LOAEL in this study is 0.1 ug/L (100 ug/m^3) for cholinesterase inhibition. USEPA used a factor of 3 to derive a NOAEL from a LOAEL. Therefore, the NOAEL would be 33 ug/m^3. Normalizing to a 24-hour exposure results in a NOAEL of 8.33 ug/m^3 and a human equivalent NOAEL of 13.3 ug/m^3. This results in an acute, subchronic, and chronic screening level of 0.13 ug/m^3. USEPA assigned a FQPA safety factor of 1X.

USEPA has classified diazinon as "not likely to be carcinogenic to humans."

1,3-dichloropropene (1,3-D)

1,3-dichloropropene (1,3-D, Telone) is a fumigant that can readily move from the soil to air and subsequently move offsite in the air. Workers breathing high concentrations of 1,3-D had irritated skin, eyes, nose and throat, coughing, nausea, headache, and fatigue. Short-term exposure of animals has also resulted in weight loss, nasal tissue damage, and death (with a sufficiently high dose). Some long-term studies resulted in carcinogenic effects, and 1,3-D has been classified as a probable human carcinogen.

DPR has set RfCs for 1,3-D to support its ongoing control measures. The acute RfC of 200 ug/m^3 was calculated from the acute inhalation NOAEL of 10 ppm (6 hours per day) in rats, based on body weight reduction that is indicative of systemic effects. This RfC was calculated using a breathing rate for children of 0.46 m^3/kg/day as opposed to the current default value of 0.59 m^3/kg/day. Using the value of 0.59 m^3/kg/day would result in a value of 160 ug/m^3. This latter value will be used as the acute screening level.

The subchronic RfC of 150 ug/m^3 was calculated from the subchronic inhalation NOAEL of 10 ppm (6 hours per day, 5 days per week) in rats, based on degeneration and necrosis in the nasal epitheliium. This RfC was calculated using a breathing rate for children of 0.46 m^3/kg/day as opposed to the current default value of 0.59 m^3/kg/day. Using the value of 0.59 m^3/kg/day would result in a value of 120 ug/m^3. This latter value will be used as the subchronic screening level.

The chronic RfC of 150 ug/m^3 was calculated from the chronic inhalation NOAEL of 5 ppm (6 hours per day, 5 days per week) in mice, based on hyperplasia and hypertrophy of the respiratory epithelium and hyperplasia of the urinary bladder mucosa. This RfC was calculated using a breathing rate for children of 0.46 m^3/kg/day as opposed to the current default value of 0.59 m^3/kg/day. Using the value of 0.59 m^3/kg/day would result in a value of 120 ug/m^3. This latter value will be used as the chronic screening level.

1,3-D is classified as a probable human carcinogen by USEPA and is listed as a carcinogen under Proposition 65. DPR has calculated a cancer potency of 0.055 $(mg/kg/day)^{-1}$, based on the occurrence of broncheoalveolar adenomas observed in male mice in a chronic inhalation study.

Dichlorvos (DDVP)

USEPA, which is scheduled to release an RED for dichlorvos, released a risk assessment for the RED in 2000. The risk assessment specifies the use of a NOAEL of 0.1 mg/kg from an oral rabbit developmental toxicity study (maternal mortality, decreased weight gain, and cholinergic signs) to evaluate short-term inhalation. This NOAEL would result

in an acute screening level of 1.7 ug/m^3. (USEPA used an uncertainty factor of 100 X, excluding the FQPA factor, for all exposure periods.) The risk assessment specifies the use of a NOAEL of 0.05 mg/kg from an oral dog chronic toxicity study (cholinesterase inhibition) to evaluate intermediate-term inhalation. This NOAEL would results in a subchronic screening level of 0.85 ug/m^3. The risk assessment specifies the use of a NOAEL of 50 ug/m3 (inhibition of brain cholinesterase) in a chronic rat inhalation study. Exposure took place 23 hours a day, 7 days a week. The amortized NOAEL is 48 ug/mg^3, and the resulting screening level would be 0.77 ug/m^3. USEPA assigned a FQPA factor of 3X and classified DDVP as having suggestive evidence of carcinogenicity.

DPR completed a RCD for DDVP in 1996, with two subsequent addenda. In the RCD, DPR evaluated acute inhalation exposure using the NOAEL of 1250 ug/m^3 (cholinergic signs) in a rabbit inhalation developmental toxicity study. Exposure took place 23 hours a day, 7 days a week. Amortizing the exposure to 24 hours results in a NOAEL of 1200 ug/m^3. Using this NOAEL, a rabbit breathing rate of 0.54 m^3/kg/day, and a 100 X uncertainty factor results in an acute screening level of 11 ug/m^3. The same study, but with the lower NOAEL 250 ug/m^3, was used to evaluate subchronic inhalation. This NOAEL would result in a subchronic screening level of 2.2 ug/m^3. The RCD used the same chronic inhalation study as was described for the USEPA risk assessment, resulting in the chronic screening level of 0.77 ug/m^3. DPR also developed a potency factor of 0.35 $(mg/kg/day)^{-1}$ based on leukemia in the rat. Since they were based on inhalation studies, the screening levels from the DPR RCD will be used.

Dicofol

Dicofol is an organochlorine insecticide related to DDT, and has moderate acute toxicity. Poisoning can affect the nervous system, liver, and kidneys. Signs associated with acute poisoning in humans include headache, fatigue, nausea, dizziness, weakness, skin irritation, and conjunctivitis, depending on the route of exposure. Very severe poisoning can result in convulsions, coma, or death. Repeated exposure studies in laboratory animals have resulted in toxicity to the nervous system, liver, adrenals, thyroid, and testes. The toxicology data for dicofol is suggestive of endocrine disruption.

USEPA completed a RED on dicofol in 1998. To evaluate short-term inhalation exposure, the RED uses a NOAEL of 4 mg/kg for increased abortions from an oral rabbit developmental toxicity study. This NOAEL results in an acute screening level of 68 ug/m^3. To evaluate intermediate-term inhalation exposure, the RED uses a NOAEL of 0.29 mg/kg for inhibition of ACTH release from a 90-day oral dog study. This NOAEL results in a subchronic screening level of 49 ug/m^3. To evaluate long-term inhalation, the RED uses a NOAEL of 0.12 mg/kg for ACTH release from a chronic oral dog study. This NOAEL results in a chronic screening level of 20 ug/m^3. USEPA assigned dicofol a carcinogen classification of C, possible human carcinogen, and recommended an RfD approach for assessing risk. USEPA assigned an FQPA factor of 3X.

Dimethoate

Dimethoate belongs to the same class of organophosphates (OPs) insecticides as **azinphos–methyl**. The health effects are the same as described for azinphos-methyl.

USEPA released a risk assessment on dimethoate in 1999 as part of the development of the RED. To evaluate short-term inhalation, the assessment uses a NOAEL of 2.0 mg/kg for neurotoxic effects (nerve damage) from an acute oral neurotoxicity study in rats. This NOAEL results in an acute screening level of 34 ug/m^3. To evaluate intermediate-term inhalation exposures, the assessment uses a LOAEL of 3.2 mg/kg for cholinesterase inhibition in a 90-day oral rat study. The LOAEL was reduced by a factor of 3X to arrive at an estimated NOAEL of 1.07 mg/kg. This NOAEL results in a subchronic screening level of 17 ug/m^3. To evaluate long-term inhalation, the RED uses a NOAEL of 0.05 mg/kg for cholinesterase inhibition in a chronic oral rat study. This NOAEL results in a chronic screening level of 0.85 ug/m^3. USEPA assigned dimethoate a carcinogenicity classification of C and recommended an RfD approach for risk assessment. USEPA assigned an FQPA factor of 1X.

Diuron

Diuron is an herbicide with low toxicity by the oral, dermal, or inhalation routes. It is not a skin or eye irritant. The primary sites of toxicity with repeated oral exposures are blood (hemolytic anemia), urinary bladder, and kidney. Diuron has also demonstrated carcinogenic effects in rats and mice, and has been identified as a likely human carcinogen.

USEPA completed an RED on diuron in 1993. To evaluate short-term inhalation, the RED uses a NOAEL of 10 mg/kg for maternal toxicity in a rabbit developmental toxicity study. Applying this NOAEL, an uncertainty factor of 10 to address interspecies uncertainty, and a factor of 10 to address intraspecies uncertainty results in an acute screening level of 170 ug/m^3. To evaluate intermediate-term inhalation, the assessment uses a NOAEL 1.0 mg/kg for altered hematological values in the first 6 months of a chronic oral rat study. Applying this NOAEL, an uncertainty factor of 10 to address interspecies uncertainty, and a factor of 10 to address intraspecies uncertainty results in a subchronic screening level of 17 ug/m^3. To evaluate long-term inhalation, the assessment uses a LOAEL 1.0 mg/kg for altered hematological values in the same chronic oral rat study. USEPA applied an uncertainty factor of 3 to estimate a NOAEL of 0.33 mg/kg. Applying this NOAEL, an uncertainty factor of 10 to address interspecies uncertainty, and a factor of 10 to address intraspecies uncertainty results in a chronic screening level of 5.7 ug/m^3. USEPA classified diuron as a likely human carcinogen (based on bladder and kidney tumors in rats and mammary tumors in mice) and derived a potency value of 0.0191 $(mg/kg/day)^{-1}$. USEPA assigned an FQPA factor of 1X.

Endosulfan

Endosulfan is an organochlorine insecticide and is highly acutely toxic by oral and inhalation routes. The primary site of its acute toxicity is the nervous system. Symptoms of acute poisoning include incoordination, imbalance, difficulty breathing, vomiting, diarrhea, convulsions, and loss of consciousness. Repeated dose animal studies have indicated toxicity to the kidney, liver, testes, blood, blood vessels, and immune system. There is also evidence that endosulfan causes endocrine disruption.

DPR is currently conducting a risk assessment on endosulfan. USEPA completed an RED on endosulfan in 2002. To evaluate short-term and intermediate-term inhalation, the RED recommends the use of a 21-day inhalation study in rats. In this study, rats were

exposed 6 hours a day, 5 days a week. The NOAEL for this study was 1.0 mg/m^3 for decreased body weight gain and hematological effects. Adjusting for the 6-hour exposure and the difference in human and rat breathing rates results in a human equivalent acute NOAEL of 0.4 mg/m^3 and an acute screening level of 4.0 ug/m^3. Adjusting for the 5 day a week exposure results in a subchronic screening level of 2.9 ug/m^3. The RED did not recommend a study or NOAEL to use to evaluate chronic inhalation. The RED established a chronic RfD of 0.006 mg/kg for decreased body weight gain and kidney injury from an oral rat chronic study. This would result in a chronic screening level of 10 ug/m^3. This value is higher than the subchronic screening level derived from an inhalation study. Therefore, the subchronic screening level will also be used to evaluate chronic exposure to endosulfan. USEPA assigned an FQPA factor of 10X. USEPA has classified endosulfan as not likely to be carcinogenic to humans.

EPTC

EPTC (eptam), molinate, and thiobencarb are thiocarbamate herbicides. They are similar to the carbamate insecticides, and likewise interfere with the acetylcholinesterase enzyme that is necessary for normal nerve transmission, though somewhat less consistently than the carbamate insecticides. Poisoning can also result in similar signs and symptoms. In addition, exposure of laboratory animals to EPTC has resulted in nerve and heart muscle degeneration. Exposure of laboratory animals to molinate has resulted in decreased fertility, nerve and muscle degeneration, and some indications of carcinogenic effects.

USEPA completed an RED on EPTC in 1998. DPR has completed a RCD on EPTC. To evaluate short-term exposures, the RED used a NOAEL of 58 mg/m^3 for myocardial degeneration (heart muscle damage) from a 90-day rat inhalation study with exposure 6 hours per day, 5 days per week. This NOAEL results in an acute screening level of 230 ug/m^3. To evaluate intermediate-term exposures, the RED used the same study. For exposures of less than 21 days, the RED used the above NOAEL, which results in a subchronic screening level of 170 ug/m^3. For intermediate-term exposures greater than 21 days, the RED used the same study, but a NOAEL of 8.3 mg/m^3 for clinical signs. This NOAEL results in a subchronic screening level of 24 ug/m^3. The RED did not select a value for evaluating long-term inhalation. The DPR RCD used an estimated NOAEL of 0.5 mg/kg/day for neuromuscular degeneration from a two-year oral rat study. This NOAEL converts to a chronic screening level of 8.5 ug/m^3. USEPA has classified EPTC as not likely to be carcinogenic to humans. USEPA assigned a FQPA factor of 10X.

Formaldehyde

OEHHA has set acute and chronic RELs for formaldehyde as part of Air Toxic Hot Spots Program. OEHHA used a 3-hour eye irritation study using human subjects (NOAEL of 0.5 ppm). OEHHA used a benchmark approach to derive a BC_{05} value of 0.44 ppm. OEHHA extrapolated a 1 hour NOAEL of 0.76 ppm using the equation, $C^n \times T = K$ (a constant), where n = 2. Using an uncertainty value of 10 for intraspecies uncertainty, OEHHA derived a 1-hour REL of 0.076 ppm. The above equation can be used to extrapolate a 24-hour NOAEL of 0.16 ppm (0.19 mg/m^3). Applying the uncertainty factor of 10 results in an acute (24-hour) screening level of 19 ug/m^3.

OEHHA used the results of a human occupational study to derive a chronic NOAEL. This study resulted in a chronic average NOAEL of 32 ug/m^3 for eye and respiratory irritation. Using an uncertainty value of 10 for interspecies uncertainty, OEHHA derived a chronic REL of 3 ug/m^3. This value will be used for both the chronic and subchronic screening levels for formaldehyde.

Formaldehyde is a probable human carcinogen. As part of Air Toxic Hot Spots Program, OEHHA lists the carcinogenic potency of formaldehyde as 2.1 x 10^{-2} (mg/kg-day)$^{-1}$.

Malathion

Malathion belongs to the same class of organophosphates (OPs) insecticides as **azinphos–methyl**. The health effects are the same as described for azinphos-methyl.

USEPA released a RED on malathion in 2000 and an updated risk assessment in 2005. To evaluate short-term and intermediate term inhalation exposures, the assessment used a LOAEL of 100 mg/m^3 for cholinesterase inhibition in a 90-day rat inhalation study in which rats were exposed 6 hours per day, 5 days per week. USEPA used a factor of 10 to derive an estimated NOAEL of 10 mg/m^3. Using the NOAEL, adjusting for the 6-hour per day exposure, and applying a total uncertainty factor of 100 X, results in an acute screening level of 40 ug/m^3. Using the NOAEL and adjusting for exposure 5 days per week results in a subchronic screening level of 29 ug/m^3.

In the RED, USEPA also indicated the use of the above NOAEL for evaluating long-term inhalation exposure. No recommendation was made for long-term inhalation exposure in the updated risk assessment. The updated assessment set a chronic RfD of 0.03 mg/kg (not including the FQPA factor) based on cholinesterase inhibition in a chronic oral rat study. If this RfD were used, the chronic screening level would be 51 ug/m^3. This is higher than the subchronic screening level generated from an inhalation study. Therefore, the lower subchronic screening level will be used as the chronic screening level. USEPA classified malathion as having suggestive evidence of carcinogenicity but not sufficient to assess human carcinogenic potential and indicated that a low-dose linear extrapolation model is not indicated. USEPA assigned an FQPA factor of 10X.

Metam Sodium/MITC

Metam-sodium, in the presence of water breaks down to **MITC** (a fumigant) and other compounds. MITC evaporates from the soil (after its application as metam sodium) and thus has the potential to move offsite in the air. MITC is a strong eye, respiratory, and skin irritant and can cause damage to these tissues. It can also exacerbate existing respiratory conditions, such as asthma.

While metam sodium is the active ingredient that is applied in agricultural settings, it converts to fumigant methyl isothiocyanate (MITC), which moves into the ambient air. Therefore, screening levels are set for MITC. DPR has completed a RCD on metam sodium and MITC. The RCD has undergone scientific peer review and has been accepted by the SRP. RELs were set in the RCD and reviewed by the SRP. DPR calculated an acute REL of 22 ppb (66 ug/m^3) based on eye irritation in a study of human volunteers. DPR calculated a subchronic REL of 1 ppb (3 ug/m^3) based on nasal epithelial atrophy in rat subchronic inhalation study. DPR calculated a chronic REL of

0.1 ppb (0.3 ug/m^3) based on the same subchronic rat study, but employing an uncertainty factor of 10X to address the uncertainty of using a subchronic value for chronic exposure. While metam sodium is classified by USEPA as a probable human carcinogen, USEPA has categorized MITC as having insufficient data for carcinogenicity classification. In the RCD, DPR concluded that the data were not sufficient to support a quantitative assessment of carcinogenicity. USEPA did not assign a FQPA factor to MITC. The above RELs will be used as the screening levels.

Methyl Bromide

Methyl bromide is a fumigant that can readily move from the application site to air and subsequently move offsite in the air. Methyl bromide can cause severe irritation to the eyes, skin, and mucus membranes. Neurotoxicity has been observed in humans and laboratory animals after exposure to methyl bromide. In animals, damage has been observed in a variety of tissues, depending on the level and length of exposure. These tissues include nasal tissues, brain, heart, testes, testes, adrenal glands, spleen, and kidney. Methyl bromide caused developmental effects in rats and rabbits. In humans exposed to high concentrations, neurological effects included ataxia, convulsions, and tremors. Sufficiently high exposures can result in death.

DPR completed an RCD for methyl bromide. RfCs were calculated in the RCD. DPR calculated an acute RfC of 210 ppb (820 ug/m^3) based on developmental effects (NOAEL of 40 ppm) in a rabbit developmental toxicity study. DPR calculated a subchronic RfC of 9 ppb (35 ug/m^3) based on neurotoxic effects in a subchronic dog inhalation study designed to evaluate neurotoxicity (NOAEL of 5 ppm). DPR calculated a chronic RfC of 1 ppb (3.9 ug/m^3) based on nasal epithelial hyperplasia and degeneration in a chronic rat inhalation study (LOAEL of 3 ppm, estimated NOAEL of 1 ppm).

OEHHA disagreed with DPR's use of 5 ppm as the critical subchronic NOAEL and felt that an estimated subchronic NOAEL of 0.5 ppm (from a different dog study) and a resulting subchronic RfC of 1 ppb should have been used. USEPA released a draft risk assessment for public comment in July 2005. The risk assessment used the same acute, subchronic, and chronic studies and corresponding NOAELs as DPR. USEPA may use somewhat different assumptions in arriving at an acute, subchronic, and chronic non-occupational RfCs in the final draft of the risk assessment. USEPA has classified methyl bromide as not likely to be carcinogenic to humans. USEPA assigned a FQPA factor of 1X.

Metolachlor

Metolachlor is a broad-spectrum herbicide with low acute toxicity. Longer-term studies indicated decreased weight gains and some liver toxicity. There was evidence of liver carcinogenicity in a long-term rat study, but not in a corresponding mouse study.

USEPA issued a Tolerance Reassessment Decision (TRED) on metolachlor and s-metolachlor in 2002. The TRED was based on a report of the USEPA Hazard Identification Assessment Review Committee (HIARC) released in 2001. In this report, USEPA specified the use of the NOAEL of 50 mg/kg (for clinical signs, decreased body weight gain, and decreased food consumption) in an oral rat developmental toxicity study

with s-metolachlor, for assessing short-term inhalation exposure. USEPA specified the use of the NOAEL of 8.8 mg/kg (for decreased body weight gain) in an oral dog subchronic toxicity study, for assessing intermediate-term inhalation exposure. USEPA specified the use of the NOAEL of 9.7 mg/kg (for decreased body weight gain) in an oral chronic dog study with metolachlor for assessing long-term inhalation exposure. In all cases, USEPA specified the use of a total uncertainty factor of 100X. This would result in acute, subchronic, and chronic screening levels of 85 ug/m^3, 15 ug/m^3, and 16 ug/m^3, respectively. Since the subchronic screening level is slightly lower than the chronic screening level, it will be used for both subchronic and chronic. USEPA has classified metolachlor as a C, possible human, carcinogen, but has specified a non-linear MOE approach. USEPA assigned a FQPA factor of 1X.

Molinate

Molinate is a thiocarbamate herbicide similar to **EPTC** (eptam). The health effects are the same as described for EPTC.

DPR completed a RCD on molinate in 1996. Although acute and subchronic rat inhalation studies were available, DPR concluded that they had questionable value in risk assessment, since the average absorbed doses (based on metabolic measurements) were grossly in excess of the theoretical values based on inhalation alone. As a result, the RCD evaluated ambient air using the NOAELs from oral studies. Acute inhalation was evaluated based on a NOAEL of 11.5 mg/kg/day for sperm abnormalities (after 5 days) in a rat study. Using this NOAEL, a combined uncertainty factor of 100, and the conversion factor of 1.7 results in a screening level of 200 ug/m^3. Seasonal (subchronic) inhalation was evaluated using the NOAEL of 0.48 mg/kg for sperm abnormalities from an oral 5-week rat study. Using this NOAEL, a combined uncertainty factor of 100, and the conversion factor of 1.7 results in a subchronic screening level of 8.2 ug/m^3.

USEPA released a revised risk assessment on molinate in 2002, but stopped further work on an RED since USEPA and the registrant agreed to a phase-out of the use of molinate. In the risk assessment, USEPA selected the NOAEL of 120 mg/m^3 for neurotoxic effects in a 4-hour rat inhalation study as the basis of assessing short-term inhalation exposure. Adjusting for a full 24-hour exposure and the difference in rat and human breathing rates results in a human equivalent NOAEL of 32 mg/m^3. Applying the combined uncertainty factor of 100 results in a screening level of 320 ug/m^3. USEPA selected the NOAEL of 0.3 mg/m^3 for reproductive effects in a 4-week rat inhalation study as the basis of assessing intermediate-term inhalation exposure. Exposure took place 6 hours a day, 5 days a week, resulting in an adjusted NOAEL of 0.054 mg/m^3 and a human equivalent NOAEL of 0.086 mg/m^3. Applying the combined uncertainty factor of 100 results in a subchronic screening level of 0.86 ug/m^3.

Molinate is used on rice during a discrete time period each year. As a result, chronic exposure to molinate in the ambient air does not occur. Neither DPR nor USEPA evaluated chronic inhalation exposure. USEPA retained the FQPA safety factor of 10X. USEPA classified molinate as having suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenicity.

Naled

DPR completed a RCD on Naled in 1999 and an addendum in 2001. In the RCD, acute exposure, including inhalation, was evaluated using an estimated NOAEL of 2.5 mg/kg, based on neurotoxic effects in an oral rat Functional Observational Battery study. Subchronic exposure was evaluated using a NOAEL of 2.5 mg/kg (in terms of absorbed dose and amortized for daily exposure) for cholinesterase inhibition in a subchronic dermal rat study. Chronic exposure was evaluated using a NOAEL of 0.2 mg/kg for brain cholinesterase inhibition in a chronic rat study. This would result in acute, subchronic, and chronic screening levels of 43 ug/m^3, 43 ug/m^3, and 3.4 ug/m^3, respectively.

In 2002, USEPA released an RED on naled. In the RED, USEPA used a NOAEL of 0.23 mg/m^3 for cholinesterase inhibition from a 13-week rat inhalation study to evaluate inhalation exposure of any duration. In this study, exposure took place 6 hours per day, 5 days per week. Adjusting for the 6-hour exposure and breathing rate differences results in a human equivalent NOAEL of 92 ug/m^3. Applying an uncertainty factor of 100 results in an acute screening level of 0.92 ug/m^3. Adjusting for exposures 5 days per week results in subchronic and chronic screening levels of 0.65 ug/m^3. USEPA assigned a cancer classification of E, evidence of non-carcinogenicity and assigned a FQPA factor of 1X. Since the screening levels based on the RED are derived from an inhalation study, they will be used here.

Norflurazon

USEPA completed an RED in 1996 and a TRED in 2002. Neither document addressed inhalation exposure; therefore, the screening levels are set based on oral toxicity values. The TRED evaluated acute dietary exposure using the NOAEL of 10 mg/kg/day for increased skeletal variations in an oral rabbit developmental toxicity study. Using this NOAEL and a combined uncertainty factor of 100 results in an acute screening level of 170 ug/m^3. The TRED evaluated chronic dietary exposure using the NOAEL of 1.5 mg/kg/day for liver toxicity in a 6-month oral dog study. Using this NOAEL and a combined uncertainty factor of 100 results in chronic screening level of 26 ug/m^3. The TRED did not evaluate intermediate-term or subchronic exposure; therefore, the chronic screening level of 26 ug/m^3 will also be used as the subchronic screening level. USEPA has classified norflurazon as a C, possible human carcinogen based on liver tumors, but did not recommend a quantitative risk assessment. USEPA assigned an FQPA factor of 3X only for acute exposure of females 13-50 years of age, while assigning an FQPA factor of 1X for all other acute exposures and all chronic exposures.

OEHHA commented that a six-month dog study should not be considered chronic, but rather it is a subchronic exposure. An additional uncertainty factor should be applied to convert the subchronic NOAEL to estimate a chronic NOAEL. Applying an additional uncertainty factor of 10 would result in a chronic screening level of 2.6 ug/m^3. This will be considered when evaluating the monitoring results.

Oryzalin

USEPA completed an RED in 1994 and published a risk assessment in 2003, which will form the basis for a TRED. In the risk assessment, USEPA specified evaluating short-

term inhalation using the NOAEL of 25 mg/kg (maternal toxicity in an oral rabbit developmental toxicity study) and applying an uncertainty factor of 100X. This would result in an acute screening level of 420 ug/m^3. USEPA specified evaluating intermediate-term and long-term inhalation using the NOAEL of 13.82 mg/kg (decreased weight gain, hematological effects, and thyroid effects in a chronic rat feeding study) and applying an uncertainty factor of 100X. This would result in a subchronic and chronic screening level of 230 ug/m^3. USEPA classified oryzalin as likely to be carcinogenic to humans and assigned a slope factor of 0.00779 $(mg/kg/day)^{-1}$. USEPA assigned an FQPA factor of 1X.

Oxyfluorfen

Oxyfluorfen is an herbicide with low acute oral, dermal, and inhalation toxicity. In repeated dose studies in a variety of animals, oxyfluorfen inhibited heme production, resulting in a variety of anemias, and caused mild liver toxicity. Oxyfluorfen also caused liver tumors in mice, resulting in its classification as a possible human carcinogen.

USEPA completed an RED in 2002. In the RED, USEPA specified evaluating short-term inhalation using the NOAEL of 30 mg/kg (maternal toxicity in an oral rabbit developmental toxicity study) and applying an uncertainty factor of 100X. This would result in an acute screening level of 510 ug/m^3. USEPA specified evaluating intermediate-term inhalation using the LOAEL of 32 mg/kg (liver toxicity in a subchronic mouse feeding study), and applied an uncertainty factor of 3X to derive a NOAEL of 10.67 mg/kg. Applying an uncertainty factor of 100X results in a subchronic screening level of 180 ug/m^3. USEPA specified evaluating long-term inhalation using the NOAEL of 3.0 mg/kg (liver toxicity in chronic dog and mouse studies). Converting from oral to inhalation by multiplying by 1.7 and applying an uncertainty factor of 100X would result in a chronic screening level of 51 ug/m^3. USEPA classified oxyfluorfen as a possible human carcinogen based on liver tumors in mice and assigned a slope factor of 0.0732 $(mg/kg/day)^{-1}$. USEPA assigned an FQPA factor of 1X.

Permethrin

Cypermethrin and permethrin belong to a class of insecticides called pyrethroids. The health effects are the same as described for **Cypermethrin**.

USEPA completed an RED on permethrin in 2005. In the RED, USEPA specified using the NOAEL of 42 mg/m^3 (neurotoxicity in a 15 day rat inhalation study) to evaluate short-term, intermediate-term, and long term-inhalation exposure. USEPA applied an uncertainty factor of 100X. The study exposed animals 6 hours a day for an average of 3.75 days a week. Adjusting for exposure for 24 hours and differences in breathing rates results in a human equivalent acute NOAEL of 16.8 mg/m^3. Applying the uncertainty factor of 100X results in an acute screening level of 168 ug/m^3. Adjusting this value for exposure 3.75 days per week results in subchronic and chronic screening levels of 90 ug/m^3. USEPA classified permethrin as likely to be carcinogenic to humans based on lung tumors in mice and derived a slope factor of 0.00957 $(mg/kg/day)^{-1}$. USEPA assigned an FQPA factor of 1X.

Phosmet

USEPA completed an IRED for Phosmet in 2001. In the IRED and supporting risk assessment, USEPA specified evaluating short-term inhalation using the NOAEL of 4.5 mg/kg (cholinesterase inhibition an acute rat oral neurotoxicity study) and applying an uncertainty factor of 100X. This would result in an acute screening level of 77 ug/m^3. USEPA specified evaluating intermediate-term inhalation using the NOAEL of 1.5 mg/kg (cholinesterase inhibition in an oral subchronic rat neurotoxicity study) and applying an uncertainty factor of 100X. This would result in a subchronic screening level of 26 ug/m^3. USEPA specified evaluating long-term inhalation using the NOAEL of 1.1 mg/kg (cholinesterase inhibition in an oral rat chronic toxicity study) and applying an uncertainty factor of 100X. This would result in a chronic screening level of 18 ug/m^3. USEPA classified phosmet as having suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential. USEPA assigned an FQPA factor of 1X.

Propanil

Propanil is an herbicide used primarily on rice. It has a relatively low acute oral or inhalation toxicity, but can cause skin and eye irritation. Longer-term animal studies have indicated toxicity to the blood and blood forming organs, endocrine effects (including testicular toxicity), carcinogenic effects, and possible effects on the immune system.

USEPA completed an RED on propanil in 2002. In the RED, USEPA specified evaluating inhalation for all time periods using the LOAEL of 9 mg/kg for increased methemoglobin, increased spleen weight, and increased weights of seminal vesicles and prostates in males in a chronic oral rat study. USEPA applied an uncertainty factor of 3X to estimate a NOAEL of 3 mg/kg. USEPA applied an uncertainty factor of 100 to address intraspecies and interspecies variation, resulting in an acute, subchronic, and chronic screening level of 51 ug/m^3. USEPA classified propanil as having suggestive evidence of carcinogenicity but not sufficient to assess human carcinogenic potential. USEPA assigned a FQPA factor of 1X.

Propargite

Propargite is a miticide, is severely irritating to the skin and eyes, and is considered corrosive. These effects have been seen in workers exposed to propargite. Propargite has also been identified as a probable human carcinogen and a developmental toxin based on the results of animal toxicity studies.

USEPA completed an RED on propargite in 2001. In the RED, USEPA used a LOAEL of 310 mg/m^3 (mortality in a 4-hour rat inhalation study) to evaluate short-term, intermediate term, and long-term inhalation. The RED specified a total uncertainty factor of 1000X. This included a 10X factor due to the lack of a NOAEL, the severity of effects at the lowest dose tested, and the 4-hour exposure duration. Adjusting for differences in human and rat breathing rates and using this 1000X uncertainty factor would result in a screening level of 496 ug/m^3 for all timeframes. USEPA has classified propargite as a probable human carcinogen based on intestinal tumors in rats. The RED specified a cancer potency factor of 0.0033 $(mg/kg/day)^{-1}$. USEPA assigned an FQPA factor of 1X.

DPR completed an RCD on Propargite in 2004. In the RCD, DPR derived an acute RfC of 14 ug/m^3 based on maternal toxicity at 2 mg/kg in a rabbit developmental, an oral absorption rate of 40%, and an uncertainty factor of 100. DPR derived a chronic RfC of 26 ug/m^3 based decreased body weights and decreased food consumption at 3.8 mg/kg in a chronic rat study, an oral absorption rate of 40%, and an uncertainty factor of 100. The seeming incongruity of a chronic NOAEL higher than the acute NOAEL is probably the result of dose selection. Since the current process is intended to develop screening levels, a conservative approach would be to use the lower acute value to examine all time periods. For propargite, the screening level of 14 ug/m^3, derived from the acute RfC will be used for evaluating acute, subchronic, and chronic exposures. In the RCD, DPR calculated cancer potency values in a range of 0.0059 to 0.026 $(mg/kg/day)^{-1}$.

SSS-tributyltriphosphorotrithioate (DEF)

In 1999, DPR completed an RCD on DEF that was peer reviewed by the SRP. The RCD derived an acute and subchronic REL of 8.8 ug/m^3 based on cholinesterase inhibition and clinical signs in a 90-day rat inhalation study. Since DEF is not used year round, chronic inhalation exposure was not evaluated. DPR derived a carcinogenicity potency factor of 0.084 $(mg/kg/day)^{-1}$. In a 1999 IRED, USEPA specified the use of the same study to evaluate short-term and intermediate term exposure. The RED also did not evaluate long-term inhalation exposure. USEPA classified DEF as a likely high dose/not likely low dose carcinogen and recommended that a potency factor not be calculated. USEPA retained the FQPA factor of 10X.

Simazine

Simazine belongs to a class of herbicides called triazines and has low acute oral, dermal, and inhalation toxicity. Longer-term studies in animals have resulted in effects on a number of blood parameters (e.g., depressed red blood cell count), reduced body weights, and carcinogenic effects. Simazine has been classified as a possible human carcinogen.

USEPA is scheduled to release an IRED on simazine in 2006. In 2005, USEPA released a revised risk assessment that will form the basis for the IRED. In the assessment, USEPA recommended evaluating short-term inhalation exposure using a NOAEL of 6.25 mg/kg from a 28-day oral pubertal study in rats. This NOAEL results in an acute screening level of 110 ug/m^3. In the assessment, USEPA recommended evaluating intermediate-term and long-term inhalation exposure using a NOAEL of 1.8 mg/kg from an oral 6-month luteinizing hormone surge study in rats. This NOAEL results in a subchronic and chronic screening level of 31 ug/m^3. USEPA classifies simazine as a possible human carcinogen; however, a change in classification to not likely to be carcinogenic to humans is pending. USEPA assigned an FQPA factor of 3X.

Sulfur

Sulfur is found in a variety of fungicides and is also available as a powder. It has a low oral toxicity. However, it can cause skin, eye, and respiratory irritation. Inhalation exposure to large amounts of sulfur dust can cause inflammation of the nasal mucosa, bronchitis, cough, and expectoration.

There was insufficient information to derive screening levels for sulfur.

Thiobencarb

USEPA completed an RED in 1997. Since the acute inhalation toxicity was low, the RED did not assess inhalation risk. Short-term toxicity was addressed with a NOAEL of 25 mg/kg for decreased skeletal ossification in a rat oral developmental toxicity study. Intermediate-term toxicity was addressed with a NOAEL of 2 mg/kg for liver and kidney effects in an oral rat subchronic toxicity study and an oral rat multigeneration study. Long-term dietary toxicity was addressed with a NOAEL of 1 mg/kg for decreased body weight and changes in clinical chemistry in a two-year oral rat chronic toxicity study. In all three scenarios, USEPA used a total uncertainty factor of 100X. This would result in acute, subchronic, and chronic screening levels of 425 ug/m^3, 34 ug/m^3, and 17 ug/m^3, respectively. USEPA assigned a carcinogenicity classification of D, not classifiable as to carcinogenicity. USEPA did not retain the FQPA safety factor.

Trifluralin

Trifluralin is an herbicide and has a low acute oral toxicity. It is classified as a dermal sensitizer. Trifluralin has been classified as a possible human carcinogen, based on evidence in male and female rats.

USEPA completed an IRED on trifluralin in 2004. The IRED assessed short-term inhalation was assessed using a NOAEL of 300 mg/m^3 for methemoglobinemia and clinical signs in a 30-day rat inhalation study in which exposure took place 6 hours a day, 5 days a week. The amortized 24-hour NOAEL would be 75 mg/m^3. Adjusting for differences in rat and human breathing rates and applying a total uncertainty factor of 100X results in an acute screening level of 1,200 ug/m^3. Intermediate-term inhalation was assessed using a NOAEL of 10 mg/kg for kidney and urine chemistry effects in an oral rat urinalysis study. This would convert to a subchronic screening level of 170 ug/m^3. Long-term inhalation was assessed using a NOAEL of 2.4 mg/kg for decreased body weight, decreased red blood cells, and other hematological effects in an oral chronic dog study. This would convert to a chronic screening level of 41 ug/m^3. USEPA classified trifluralin as a C, possible human carcinogen and derived a cancer potency value of 0.0058 $(mg/kg/day)^{-1}$. USEPA assigned an FQPA factor of 1X.

Xylenes

OEHHA established acute and chronic RELs for xylenes. OEHHA set an acute 1-hour REL of 22 mg/m^3 based on a derived 1-hour NOAEL of 220 mg/m^3 for eye and respiratory irritation in human volunteers and an uncertainty factor of 10 X for human variation. The 1-hour NOAEL was extrapolated from a 30-minute NOAEL of 430 mg/m^3. Using this same relationship, a 24-hour NOAEL of 9.0 mg/m^3 can be calculated. Applying the 10X uncertainty factor results in 24-hour acute screening level of 900 ug/m^3. OEHHA set a chronic REL of 700 ug/m^3 based on a LOAEL for central nervous system effects and eye and respiratory irritation identified in a study of exposed factory workers (after adjusting for 24 hours per day, 7 days a week exposure). OEHHA used an uncertainty factor of 3X to derive a NOAEL from a LOAEL and an uncertainty factor of 10X to address human variation. The chronic REL derived by OEHHA will be used as the subchronic and chronic screening level. IRIS classifies xylenes as having inadequate evidence for an assessment of the carcinogenic potential of xylenes.

for an assessment of the carcinogenic potential of xylenes.

CHEMICAL	Acute[a]			Subchronic			Chronic			FQPA SAFETY FACTOR	Cancer Potency (Q_1^*) (mg/kg-day)$^{-1}$
	NOAEL (ug/m^3)[b,c]	UF	Screening Level (ug/m^3)	NOAEL (ug/m^3)[b,c]	UF	Screening Level (ug/m^3)	NOAEL (ug/m^3)[b,c]	UF	Screening Level (ug/m^3)		
Acrolein	10(man,1 hr)[d]	60	**0.19**	160 (rat)	9	**0.18**	160(rat)	27	**0.06**		
Arsenic	190(rat,4hr)[d]	1000	**0.03**	190(rat,4hr)[d]	1000	**0.03**	190(rat,4 hr)[d]	1000	**0.03**		12
Azinphos-methyl	0.75mg/kg(man)	10	**101**	0.25mg/kg(man)	30	**11**	0.15 mg/kg (dog)	30	**6.8**	1	
Carbon disulfide	6.2x10^5(rat,6hr)	100	**1,550**	2.4x10^4(man)	10	**800**	2.4x10^4(man)	10	**800**		
Chlorothalonil	2.0mg/kg(rat)	100	**34**	2.0mg/kg(rat)	100	**34**	2.0mg/kg(rat)	100	**34**	1	0.011
Chlorpyrifos	74 (rat)	100	**1.2**	53 (rat)	100	**0.85**	0.03mg/kg(dog)	100	**0.51**	10	
Copper	1000 (man)	10	**100**	1000(man)	100	**10**	1000(man)	100	**10**		
Cypermethrin	2500(rat)	100	**40**	1800(rat)	100	**29**	600(rat)	100	**9.6**	1	
Diazinon	8.33(rat)	100	**0.13**	8.33(rat)	100	**0.13**	8.33(rat)	100	**0.13**	1	
1,3-D	11000 (rat)	100	**160**	7400(rat)	100	**120**	3700(mouse)	100	**120**		0.055
Dicofol	4mg/kg(rabbit)	100	**68**	0.29mg/kg(dog)	100	**49**	0.12mg/kg(dog)	100	**20**	3	
Dichlorvos	1200(rabit)	100	**11**	240(rabbit)	100	**2.2**	48(rat)	100	**0.77**	3	0.35
Dimethoate	2.0 mg/kg (rat)	100	**34**	1.07mg/kg(rat)	100	**17**	0.05mg/kg(rat)	100	**0.85**	1	
Diuron	10mg/kg(rat)	100	**170**	1.0mg/kg(rat)	100	**17**	0.33mg/kg(rat)	100	**5.7**	1	0.0191
Endosulfan	400(rat)	100	**4**	290(rat)	100	**2.9**	290(rat)	100	**2.9**	10	
EPTC	14500(rat)	100	**230**	1500(rat)	100	**24**	0.5mg/kg(rat)	100	**8.5**	10	
Formaldehyde	190(man)	10	**19**	32(man)	10	**3**	32(man)	10	**3**		0.021
Malathion	2500(rat)	100	**40**	1800(rat)	100	**29**	1800(rat)	100	**29**	10	
MITC	660(man)	10	**66**	300(rat)	100	**3**	300(rat)	1000	**0.3**		
Methyl Bromide	40ppm(rabbit)	100	**820**	5 ppm (dog)	100	**35**	1 ppm (rat)	100	**3.9**	1	
Metolachlor	50mg/kg(rat)	100	**85**	8.8mg/kg(rat)	100	**15**	9.7mg/kg(rat)	100	**16**	1	
Molinate	11.5mg/kg(rat)	100	**200**	0.48mg/kg(rat)	100	**8.2**				10	
Naled	58 (rat)	100	**0.92**	41(rat)	100	**0.65**	41(rat)	100	**0.65**	1	
Norflurazon	10mg/kg(rabbit)	100	**170**	1.5mg/kg(dog)	100	**26**	1.5mg/kg(dog)	100	**26**	3[e]	
Oryzalin	25mg/kg(rabbit)	100	**420**	14mg/kg(rat)	100	**230**	14mg/kg(rat)	100	**232**	1	0.00779
Oxyfluorfen	30mg/kg(rabbit)	100	**510**	11mg/kg	100	**180**	3.0mg/kg(dog)	100	**51**	1	0.0732
Permethrin	10500(rat)	100	**168**	5600(rat)	100	**90**	5600(rat)	100	**90**	1	0.00957
Phosmet	4.5mg/kg(rat)	100	**77**	1.5mg/kg(rat)	100	**26**	1.1mg/kg(rat)	100	**18**	1	
Propanil	3mg/kg(rat)	100	**51**	3mg/kg(rat)	100	**51**	3mg/kg(rat)	100	**51**	1	
Propargite	2mg/kg(rat)	100	**14**	2mg/kg(rat)	100	**14**	2mg/kg(rat)	100	**14**	1	0.0059-0.026
DEF	600(rat)	100	**8.8**	600(rat)	100	**8.8**				10	0.084
Simazine	6.25mg/kg(rat)	100	**110**	1.8mg/kg(rat)	100	**31**	1.8mg/kg(rat)	3		3	
Sulfur	Insufficient data to derive screening levels										
Thiobencarb	25mg/kg(rat)	100	**425**	2mg/kg(rat)	100	**34**	1mg/kg(rat)	100	**17**	1	
Trifluralin	75000(rat)	100	**1200**	10mg/kg(rat)	100	**170**	2.4mg/kg(dog)	100	**41**	1	0.0058
Xylenes	9000(man)	10	**900**	22000(man)[d]	30	**700**	22000(man)[d]	30	**700**		

ATTACHMENT V – RESPONSES TO COMMENTS ON THE PROTOCOL

Responses are in bold font.

Page 3, Section 1.2: Pesticide use - On page 3, the last paragraph states that about 120,000 pounds of pesticides were used during 2003 within 5 miles of Parlier. Based on Table 8, the pesticide use for 2003 within 5 miles of Parlier should be about 1.3 million pounds.

The correction has been made.

Page 4, Section 1.3.1: LAG membership - On page 4, membership of the local advisory group is listed. While the county agricultural commissioner's office is listed, the county health department is not. Was the county health dept. invited to participate?

Yes.

Page 5, Section 1.4: Previous investigation - On page 5, previous investigations are listed. The DHS school and house dust study, conducted several years ago in Parlier, is not listed. I recall that DHS looked at pesticides that were found adsorbed to dust from different locations in Parlier. Martha Harnly was involved. You may want to reference that study also.

The other investigations listed in the protocol measured ambient chemical air concentrations. The DHS study measured pesticide exposure of children through ingestion. The study was directed toward homes in close proximity to agriculture and as a comparison between homes with residents that were farm workers and homes which did not have a resident that was a farm worker.

Page 5, Section 1.4.2: McFarland - This section notes “Methyl bromide was the only pesticide found above its screening level, but within EPA’s protective risk range.” It is also important to note that the Methyl bromide data which supports this statement was not sufficient to fully evaluate community exposure to Methyl bromide applications.

Comment was added.

Page 6, Section 1.4.3: TAC monitoring - On page 6, the text states that information is available from ARB TAC monitoring studies for 12 of the pesticides included in the Parlier monitoring. Thirteen pesticides are listed. These should agree.

Correction made.

Page 8, Section 3.2: Sampling Locations and Frequency - This section notes EPA ambient air siting criteria are important for sampling site selection. It is recommended that these criteria be adhered to for comparability purposes, but that the probe height be much lower than 15 meters so that the data are more representative of community exposures.

DPR agrees. The samples will be collected at approximately 4 to 6 meters above ground.

Page 9, Section 3.2: Monitoring locations - On page 9, the first sentence states that "air monitoring will occur . . ." I'd suggest that this be reworded as "air monitoring is proposed at . . ." since you are still taking comments on the proposal.

The sites have been agreed upon by the TAG and LAG and are expected not to change.

Page 9, Section 3.2: Monitoring frequency - On page 9, the text states that DPR will collect samples "three days per week." During the presentation on Aug. 18, you indicated that you were proposing to collect samples on three consecutive days per week. The word "consecutive" is not in the protocol. While I would recommend three random days per week, I understand your need to save personnel costs involved in collecting the samples. I'd restate this to note that the three consecutive days will be random (some weeks Monday-Thursday, other weeks Friday-Monday) and that one day will match ARB's scheduled sampling day.

The text has been changed to indicate the days will vary.

Page 9, Section 3.2: ARB monitoring - On page 9, please edit the description of ARB's monitoring, described as one day per week, to indicate that it will be one sample every 6 days, with one sample every 3 days during the high use months for 1,3-D and sulfur. You may want to make the same change in Table 10.

Change has been made.

Page 9, Section 3.2: Sample Locations and Frequency - This section notes that sampling will occur three days per week. The section should also note how this schedule compares to the Photochemical Assessment Monitoring Station (PAMS) schedule for the San Joaquin Valley Air Pollution Control District (SJV APCD) and to the schedule of the ambient air monitoring network. For comparability purposes it is recommended that the Parlier sampling schedule include the ambient sampling day in the network's "1 in 6" days.

The text has been changed to note that one day each week DPR's samples will correspond with ARB's "1 in 6" sampling schedule, and ARB's schedule corresponds with SJVAPCD's "1 in 3" schedule.

Page 10, Section 3.3: 8. ARB's assistance - On page 10, two consecutive paragraphs state that "with ARB's assistance, DPR will monitor . . ." ARB will be doing this monitoring, not DPR. Please revise these two paragraphs to indicate that with ARB's assistance, DPR will obtain data for . . . Also, the second of the two paragraphs mentions the pesticides copper and sulfur. Shouldn't this be sulfur and copper-based pesticides?

Change has been made.

Page 10, Section 3.3: Sample Type - This section should include additional information on: samples collected by SJV APCD: the type of sampling system used for collection into canisters (including information on certification of this system); and the type(s) of samples that will be collected for metals evaluation (Federal Reference Method (FRM) or non - FRM; cut points/sample volume (TSP, PM10, and/or PM2.5).

Unable to obtain a copy of SOP.

Page 10, Section 3.4: Field Tests; Section 3.5, Quality Control for Field Sampling - These sections should include or reference specific quality control criteria.

Text changed.

Page 10, Section 3.5: Quality Control for Field Sampling - This section should describe field controls to evaluate blank contamination and cartridge breakthrough.

Text changed.

Page 10, Section Section 3.5: QC for sampling - On page 10, the last paragraph discusses field spikes. I see no mention of trip spikes or trip blanks. I'd recommend having at least some of both (e.g., monthly).

Trip blanks have been added. The TAG agreed that if only one type of spiked sample could be collected, due to restricted budget, field spikes would be the best option.

Page 11, Section 3.6: Meteorological Monitoring - This section should include information about the tower height(s) used for meteorological monitoring.

Height specified.

Page 12, Section 4.1: Laboratory Analysis Methods - This section should include the SJV APCD methods.

Unable to obtain a copy of SOP.

Page 12, Section 4.2: APCD monitoring - The text on page 12 should be revised to delete mention of the APCD doing CO monitoring, since we learned that they don't.

Text deleted.

Page 12, Section 4.3: Quality Assurance - Section 8, Schedule: It is recommended that the first audit be scheduled when the lab is processing the first batch of field samples. Additionally, the audits should be added to the schedule in Section 8.

Text changed.

Page 12, Section 4.3: Quality Assurance - The first paragraph of this section notes items for which the laboratory will be responsible. There should be a clear statement that the laboratory will provide "internal QA oversight." While most laboratories automatically provide internal QA oversight, it was noted during the Lompoc QA audits that GLP/University laboratories may not automatically assign their QA staff to each project.

Text changed.

Page 12, Section 4.3: Quality Assurance - The second paragraph notes that there will be review and tracking of 5% of the data. There should be a discussion of how this 5% will be selected and if the review will be done entirely while onsite or if the laboratory will submit data to the QA team for review before or after the audits.

The QA team leader will determine this.

Page 13, Section 5.1: Calculation of Air Concentrations - Note that all data should not be reported in parts per billion by volume as these units are only applicable to gaseous pollutants.

Text changed.

Page 13, Section 5.1: Calculation of Air Concentrations - On page 13, the second paragraph of section 5.1 states that "acute exposure will be estimated for each monitoring from . . ." I assume that this should be "for each monitoring location from . . ."

Text changed.

Page 13, Section 5.1: Calculation of Air Concentrations - It is not appropriate to treat samples that are below the detection limit as having residue levels equivalent to half the limit of detection (LOD). The draft protocol does not indicate how samples that are below the limit of quantitation (LOQ) will be handed. The approach described in the protocol could report presence of residues for products that may not be used in the area at all, leading to erroneous assumptions about exposure. In a very limited case, where residues occur above the LOD but below the LOQ, it could be appropriate to assume half the LOD, so long as the assumptions and caveats are clearly explained.

Text changed.

Page 13, Section 5.1: Calculation of Air Concentrations - We are concerned about the ill-defined methodology for estimating acute exposures.

Did not understand comment. Protocol states: Acute exposure will be estimated for each monitoring location from the individual 24-hour samples by calculating the 95th percentile concentration for each pesticide.

Page 13, Section 5.2: Health Evaluation Methods - This section states that "No state or federal agency has established regulatory health standards for pesticides in air." This statement should be re-phased, as EPA and state waste programs have developed

standards for some pesticides in air on a site-specific basis. This section should also address the non-pesticide data that will be collected. Additionally, it would be helpful if "significant exceedance" was specifically defined for both the acute and chronic exposure scenarios.

Text changed.

Page 14, Section 5.2: Health Evaluation Methods - In particular, we question the fairness and accuracy of the development of the Hazard Index that "assumes that toxicity and risk of all monitored pesticides are additive, although only a subset of the monitored pesticides (including organophosphate insecticides and oxygen analog breakdown products toxic to the nervous system) are known to act in an additive manner." While we understand and support the desire to be cautious when measuring the pesticides in question, we are concerned that such an approach will not only be unscientific but also lead to unnecessary health concerns on the part of the general population. The conclusions that could be derived from such a method could be inaccurate and, in our view, lead to unintended consequences. We would hope that the measurement of the monitoring results is completed in the most objective manner possible and not by simply taking the cumulative approach, without proper justification, as described in your draft document.

This approach is consistent with the one DPR used for the Lompoc project. The additive approach is health-conservative and acts as screening tool. If the health index exceeds one using the additive approach, this will trigger DPR to conduct a more thorough analysis of the data. DPR will not take regulatory action based on the assumption of additive toxicity for all pesticides.

Page 15, Section 5.3: Modeling - On page 15, the text states that modeling may be used and that the ISC model will be used to "estimate the modeled concentrations." I would restate this to indicate that a U.S. EPA approved air dispersion model appropriate for the Parlier vicinity may be used to estimate air concentrations during times or at locations with no air monitoring data. You should be aware that U.S. EPA may propose to remove ISC3 from their list of approved models.

Text changed.

Page 15, Section 5.3: Modeling - The proposed protocol would use EPA's Gaussian Plume model to estimate pesticide distribution for places that are not monitored. (This model is currently used for tracking particulate matter in EPA's Source Apportionment Analysis, and was used for the dust propagation modeling around Manhattan Island following destruction of the World Trade Center Towers in 2001.) For this model to be meaningful for pesticide distribution, DPR must first validate the model using the data from the monitoring study.

DPR, EPA, registrants, and others have used ISCST to model agricultural pesticide applications, and have compared predicted concentrations with measured air concentrations. ISCST agrees with measured air concentrations in most situations.

Page 16, Section 7.1: Precautionary approach - On page 16, section 7 is listed as "Risk Reduction and Precautionary Approaches." I didn't find anything about the IWMB program for the precautionary approach, although they are participating in the TAG for that purpose. I'd suggest adding something here.

IWMB has not developed a plan yet.

Additional Comments:

In an e-mail dated October 17, 2005 to the Director of CDPR, five concerned members of the Local Advisory Group (LAG) requested that the monitoring for VOC and metal-associated pesticides conducted by ARB be expanded. The e-mail expressed concern that although the fumigants applied in the Parlier area seem to present the greatest potential for exposure risk to the community, the proposed VOC sampling by ARB would only occur 1-day in 6 as opposed to the 3 days a week schedule for DPR pesticide samples. It was felt the 1-day in 6 schedule would not provide accurate estimates of 1,3-D or methyl bromide exposures. Concern was also expressed that the data for 1,3-D and methyl bromide could not by used the UCSF Fresno in their study to assess the potential health impacts of pesticides and criteria pollutants in cooperation with CDPR's environmental monitoring.

The LAG members recommended that CDPR make a formal request to CARB for expanded VOC monitoring (3 days per week at one site). They provided two suggestions as possible means of accomplishing: 1) temporary re-assignment of VOC analysis away from the TAC monitoring locations where records indicate historically lower average cumulative VOC levels, or 2) CARB and/or CDPR formally request assistance from US EPA Region 9 to perform the laboratory analysis of the VOC samples. The latter option appears both logical and feasible, as recent inquires to EPA Region 9's Air Methods Laboratory suggest that they have the capacity to perform the 3 samples/week VOC analysis recommended for this project.

In addition, a request at a California Environmental Justice Advisory Committee (CEJAC) meeting, it was requested that we also consider additional monitoring for chloropicrin

Summary of the Director's response:

That DPR has allocated its entire air monitoring budget for two fiscal years to the project. ARB is assisting DPR with air monitoring during this pilot project by monitoring VOCs, metals, particulate matter, and weather conditions for the full year in Parlier. Neither agency is receiving additional funding for these projects, and must use existing resources to conduct them.

It was stated that with the current monitoring protocol, DPR will be able to estimate both average and high exposures for all VOCs, including methyl bromide and 1,3-dichloropropene. Concern was also expressed that the redirection of ARB resources would mean eliminating monitoring in areas of the State where there are also pesticide concerns. It was also pointed out that since the U.S. EPA use a different analytical method than ARB, all of the VOC sampling would need to be sent to the U.S. EPA laboratory for consistency.

In response to the request for additional chloropicrin in the Parlier it was noted that Chloropicrin use in Parlier appears to be declining. During 2004, there were only three applications of chloropicrin within five miles of Parlier. It was felt that that monitoring for a pesticide with such infrequent use near Parlier may not be a good use of limited resources. In addition, DPR is preparing a statewide health risk

assessment for chloropicrin based in part on monitoring studies done in California. Based on the results of the risk assessment, DPR may develop mitigation options to reduce public exposure to chloropicrin.

Summarized comments from members of the ARB Technical Committee on their review in e-mail dated 12/21/2005:

1. Would it be possible during the peak use period sampling for 1,3-dichloropropene and sulfur to do some consecutive days of sampling rather than once every third day? We had tried looking in the past at once of every sixth day sulfur concentrations with pesticide application data to see if we could discern any impacts and it was very difficult to do as it always seemed like the ambient sampling day never coincided with the nearby pesticide application. With some periods of every day sampling, you may be more likely to pick up any impacts that might occur, especially if they are short-term.

It was felt that spreading out the sampling so consecutive days of sampling could be collected would result in too much time passing in between sampling periods when short periods of higher concentrations could occur and would be missed.

2. I would suggest having a modeling protocol for the modeling project. This should also include some model performance evaluation using the model to predict known concentrations at a receptor to ensure that the model is adequate.

Section 5.3 describes DPR's plan to use computer modeling to attempt to estimate ambient air concentrations from pesticide applications made during monitoring to evaluate the model. If successful, modeling can be used to supplement measured air concentrations to determine potential concentrations at places and time periods other than the ones monitored.

In e-mail dated 12/22/2005: summarized

1. Make sure it follows EPA600/4-90-10 (Organochloride Pesticides in Air) and 600/8-90-041 (Pesticides in Air) quality control procedures and general protocols, as applicable.

The lab is performing more quality control than is required by EPA method 600/4-90-10.

2. The reporting limits seem pretty high (0.25-2.0 micrograms). Having a reporting limit significantly higher than the detection limit could result in underreporting (under quantifying the pesticide residues present) because you are reporting non-detect (under the reporting limit) for more samples than you need to.

The reporting limits are all below our health screening levels for all of the chemicals.

3. The procedure for cleaning the XAD-4 resin is not included in the protocol. The UC Davis Trace Analytical Laboratory developed a protocol for cleaning resin March 29, 2000 for their Lompoc Air Sample Study.

The CDFA Analytical lab's protocol for cleaning resin is basically identical to UC Davis's resin cleaning protocol.

4. Section 10.2-Instrument calibration - three levels for a linear curve is not uncommon. However, they list that they have standards at 5 levels-- I would want to make sure that if they go to a quadratic, instead of linear fit, they use more than three levels (use 4 or 5 of the standards). Obviously with a quadratic and only 3 points anything could be made to fit a formula.

The CDFA Analytical Lab uses 5 levels of standards (0.1, 0.5, 1.0, 2.0 and 5.0ng/μL) for all analytes. They use a linear fit for all of them. If an instrument problem causes a difficulty in obtaining a linear fit they always try to fix the problem and rerun them. Quadratic fit is the last option to salvage the data.

5. Section 11.3-- Endosulfan sulfate and propargite have similar retention and starting times, but can't be analyzed by LCMS confidently so there may be overlap between the peaks that won't be able to be confidently separated so the concentration of these may be questionable.

According to the Lab there is no separation and identification problems between these two chemicals. The endosulfan sulfate has a retention time = 20.04 (ions monitored: 272, 387, 229, 422) and the propargite has a retention time = 20.5-20.6 (double peaks, ions monitored: 135, 173, 350)

6. On page 20 the MDL for dichlorvos is questionable-- you have significant percent recovery difference between all the duplicates. For example one set % recovery varied from 0.5 to 136 another 50%-109%; another varied 67%-105%; and another varied 66% to 126. It begs the question of if there was an interference or contamination or if this method is not appropriate. Plus I can't quite understand the numbers, it looks like there could be excel sheet/mathematical errors. I.E. set 3 recovered 0.550 micrograms out of 0.5 micrograms but reported 0.5% recovery.

This method may be able to give only a qualitative analysis of dichlorvos rather than a quantitative amount. The percentage recovery of 0.5% for set 3 is a typing error. The true percentage recovery is 110%.

Comments on the Screening Levels:

1. FQPA factor: In the discussion of each chemical it would be useful to include the basis for the FQPA factor (or lack of one).

   FQPA factor- Time does not permit inclusion of a discussion of USEPA's basis for determining each FQPA factor in the protocol; however, that might be developed and included in the final report.

2. Consider expanding table to include endpoint for each exposure duration/NOAEL. May need to have three separate tables, one for each exposure duration.

   Expansion of table- I am not sure how the table will be incorporated into the protocol. As with the FQPA factor, time does not permit expansion of the table to include toxicity endpoints for the protocol; however, it may be appropriate for the final report. As you point out, the table would probably have to be broken up, but that could be done. In any case, the information is available in the write-ups on each chemical.

3. OEHHA does not use the conversion from rat NOAEL to human equivalent NOAEL (rat NOAEL x 1.6 = human equivalent NOAEL). This in effect says that once the material in inhaled, the absorption characteristics of the respiratory systems between the two species are equivalent and that humans are less sensitive (have higher NOAELs) than rats. We do not believe that either assumption is necessarily or universally true and suggests that the conversion is not used, at least for screening purposes.

   I have now included your comments on the conversion factor in the beginning of the document. However, we continue to think it appropriate to adjust for differences in breathing rates and resulting differences in amount of material inhaled.

4. Page1, last line of 4th paragraph: No *observed* Adverse Effect Level.
   Page 2, 3rd para: *from* humans, rather than "*than* humans"
   Page 2, last para: animal, not animal*s*
   Page 3, first para: normalize, not normaliz*ed*

   Corrected as suggested.

5. Acrolein: Suggest changing "normalized" to something like "extrapolated to continuous exposure." Change "uncertainty of intraspecies variability" to "intraspecies variability." Also change inter(and intra)species "uncertainty" to inter(and intra)species "variability." Also note that we are currently reevaluating our acute NOAEL for this compound.

   Changed as suggested.

6. Arsenic: OEHHA did not correct breathing rates; a HEC correction was not possible for arsenic.

   Corrected as suggested.

7. AZM: first para: "…sensitive *than* animals…" instead of "…sensitive *that* animals…" Same para, line 11: "… and, AN uncertainty factor…"

   Corrected as suggested.

8. Carbon disulfide: Carbon disulfide repeated twice in line three. Second para, *Hot Spots,* not *Hotspots*. Third para, fix m3, and "compensated" should be "time extrapolated."

   Corrected as suggested.

9. 1,3-dichloropropene: Insert space between 0.46 and m3 (two instances)

   Corrected as suggested.

10. Dicofol: "release of ACTH release"...???

    Corrected as suggested.

11. Dimethoate: dimethoate is misspelled in first sentence. LOAEL of 3.2 (no units given).

    Corrected as suggested.

12. Diuron: Second sentence": …NOAEL of 10 mg/kg..." Also, *chronic* (not subchronic) screening level of 5.7 mcg/cubic m.

    Corrected as suggested.

13. EPTC: *per* week, not peer week. Fix m3.

    Corrected as suggested.

14. Formaldehyde: "interspecies" should be "intraspecies". Last line: OEHHA lists the…

    Corrected as suggested.

15. Malathion: Drop comma in last line.

    Corrected as suggested.

16. Methyl Bromide: "DPR calculated a *subchronic* REL of…" Also, as you are

aware, we still have an issue with methyl bromide subchronic NOAEL (and REL) and suggest that the OEHHA value be adopted for screening purposes.

Methyl bromide. The paragraph has been changed to note OEHHA's position regarding the subchronic NOAEL. We have also included EPA's current conclusions (as released in their draft risk assessment) regarding the studies and NOAELs.

17. Molinate: Chronic exposure to molinate should be evaluated. OEHHA has PHG in which a chronic NOAEL was adopted and could be used for screening purposes.

    Since there is no chronic inhalation exposure to molinate in general and molinate is not expected to be used near Parlier, there is not a need to generate a chronic screening level at this time. However, it can be done, for the sake of completeness, in the final report.

18. Norflurazon: A six-month dog study should not be considered chronic, but rather it is a subchronic exposure. An additional uncertainty factor should be applied to convert the subchronic NOAEL to estimate a chronic NOAEL.

    We have included your comment on norflurazon.

19. Oxyfluorfen: …liver toxicity *in* a subchronic… Change the second to last sentence to: "Converting from oral to inhalation by multiplying by 1.7 and applying an uncertainty factor of 100X would result in a chronic screening …. "

    Changed as suggested.

20. Propanil: Second sentence: "…, *and* increased *weights of* seminal …" Last sentence: has to *as*.

    Changed as suggested.

21. Propargite: A mortality study is inappropriately used to derive an acute screening value; an extra UF of 10 should be applied for this endpoint or a less serious endpoint be identified. Also, fix m3.

    Propargite-USEPA did include an additional factor to account for the severity of the effect. In any case, we used a different study and NOAEL in our RCD and this resulted in a lower acute screening level than would have resulted from the use of the USEPA value.

22. Trifluralin: Third sentence: rats should be *rates*.

    Changed as suggested.

23. Xylenes: Second sentence: "NOAEL *of* 220…"