Appendix H. THPI Estimated Environmental Concentrations

Captan degrades rapidly and forms two major degradation products tetrahydrophthalimide (THPI) and tetrahydrophthalimic acid (THPAm). Aquatic toxicity data for THPI and THPAm is available and indicates that the degradates are about four orders of magnitude less toxic than the parent. However, THPI is more persistent than the parent. Tier I screening tool (GENEEC model) was used to estimate EECs, and evaluated the LOC exceedances for aquatic organisms.

THPI exhibits a low soil/water partitioning (Kd < 1) indicating that most of its run-off will be via dissolution in run-off water as opposed to adsorption in eroding soil. Teir 1 GENEEC (GENeric Estimated Exposure Concentration) modeling was used to predict EECs of THPI because of the lack of THPI environmental data for Tier II analysis.

The GENEEC model was designed to mimic Tier II PRZM/EXAMS but requires fewer inputs and less time and effort to use. The model uses application information from the chemical's label, soil/water partition data, and degradation kinetics to estimate high level exposure values in the same agricultural field farm pond scenario as used with PRZM/EXAMS simulations. The program is generic in that it does not consider differences in climate, soils, topography or crop in estimating potential pesticide exposure.

GENEEC is also simpler than the PRZM and EXAMS models in its handling of hydrology. The linked PRZM and EXAMS models simulate the impact of daily weather on the treated agricultural field over a period of thirty-six years. GENEEC, on the other hand, is a single event model. It assumes one single large rainfall/runoff event occurs that removes a large quantity of pesticide from the field to the water all at one time. Longer-term, multiple-day average concentration values are calculated based on the peak day value and subsequent values considering degradation processes.

THPI's GENEEC model input parameters are shown in **Table H1**. Conservative assumptions in THPI stability were assumed for modeling. Modeled simulations were conducted assuming a 66% conversion factor from captan to THPI and take into consideration the 50% difference in their molecular weights (lbs. captan a.i. x 0.66 x 0.50./acre = lbs. THPI a.i./acre).

Table H1. Environmental Fate and Input Parameters for THPI

Parameters	Input Value and Unit	Source of Info/Reference
Soil Partition Coefficient (Koc)	7.6	MRID 438689-11
Molecular Weight	150.16 g/mol	Calculated
Solubility (at 25° C) x 10	100 ppm	estimated
Aerobic Soil Metabolism $t_{1/2}$	19 days	MRID 3868902
Aqueous Photolysis	Stable	MRID 00096974
Hydrolysis	Stable	MRID 00096974

Table H2. GENEEC Modeling Results of THPI for Foliar Spray Food Uses			
CROP	**Max. Application Rate (lbs ai/A)**	**Max. # of Applications**	**Min. Interval Between Apps. (days)**
ALMOND	1.50	4	7
APPLE	1.33	8	5
APRICOT	0.67	5	5
BLACKBERRY	0.67	5	10
BLUEBERRY	0.83	14	7
CANEBERRIES	0.67	5	10
CHERRY	0.67	7	7
DEWBERRY	1.04	3	10
GINSENG	0.66	8	7
GRAPES	0.67	6	10
LOGANBERRY	0.67	5	3
NECTARINE	1.33	6	3
PEACH	1.33	8	3
PLUM	1.0	9	7
PRUNE	1.0	9	7
RASPBERRY (BLACK - RED)	0.67	5	10
STRAWBERRY	1.0	8	7

Table H3. GENEEC Estimated Concentration of THPI for Food Uses in Water			
CROP	**Peak Conc. µg/L**	**21 day Conc. µg/L**	**60 day Conc. µg/L**
ALMOND			
Aerial Application	136.37	112.98	80.51
Ground Application	128.88	102.27	72.81
APPLE			
Aerial Application	201.07	166.52	118.70
Ground Application	180.56	149.11	106.16
APRICOT			
Aerial Application	76.96	63.71	45.40
Ground Application	69.88	57.70	41.07
BLACKBERRY			
Aerial Application	60.58	50.18	35.77
Ground Application	54.32	44.86	31.94
BLUEBERRY			
Aerial Application	125.48	104.04	74.19
Ground Application	109.59	90.57	64.50
CANEBERRY			
Aerial Application	60.58	50.18	35.77
Ground Application	46.21	38.16	27.17
CHERRY			
Aerial Application	82.03	67.95	48.44
Ground Application	73.38	60.60	43.15
DEWBERRY			
Aerial Application	72.31	59.86	42.66
Ground Application	65.72	54.26	38.63
GINSENG			
Aerial Application	85.32	70.69	50.39
Ground Application	75.98	62.77	44.69
GRAPES			

Aerial Application	65.03	53.87	38.41
Ground Application	57.96	47.88	34.09
LOGANBERRY			
Aerial Application	85.97	71.15	50.70
Ground Application	78.56	64.84	46.16
NECTARINE			
Aerial Application	244.70	202.54	144.33
Ground Application	178.69	147.51	105.01
PEACH			
Aerial Application	240.22	198.87	141.73
Ground Application	217.88	179.89	128.06
PLUM			
Aerial Application	134.86	111.75	79.67
Ground Application	119.63	98.83	70.37
PRUNE			
Aerial Application	134.86	111.75	79.67
Ground Application	119.63	98.83	70.37
RASPBERRY (BLACK - RED)			
Aerial Application	60.58	50.18	35.77
Ground Application	54.32	44.86	31.94
STRAWBERRY			
Aerial Application	129.27	107.10	76.35
Ground Application	115.13	95.10	67.71

Table H4. THPI Foliar Spray/ Ornamentals Application Rates

CROP	Max. Application Rate (lbs ai/A)	Max. # of Applications	Min. Interval Between Apps. (days)
GOLF COURSE TURF/ SOD FARM (TURF)	1.43	2	7
ORNAMENTAL GRASSES	1.43	26	7

Table H5. GENEEC Estimated Concentration of THPI in Water

Crop	Peak Conc. µg/L	21 day Conc. µg/L	60 day Conc. µg/L
GOLF COURSE TURF/ SOD FARM (TURF)			
Aerial Application	79.29	65.61	46.43
Ground Application	72.78	60.07	42.76
ORNAMENTAL GRASSES			
Aerial Application	231.10	191.74	136.76
Ground Application	198.56	164.16	116.95

Table H6. THPI GENEEC Modeling Results for Seed Treatment Uses				
Crop	**Application rate (lbs ai/A)**	**Peak Conc. µg/L**	**21 day Conc. µg/L**	**60 day Conc. µg/L**
Alfalfa	0.029	0.73	0.60	0.43
Clover	0.03	0.66	0.54	0.38
Flax	0.02	0.50	0.42	0.30
Barley	0.03	0.76	0.62	0.44
Wheat (1.5 in.)	0.06	0.94	0.78	0.55
Wheat (unincorporated)	0.06	1.41	1.16	0.83
Sorghum	0.005	1.01	0.83	0.59
Oats	0.040	1.01	0.83	0.59
Rye	0.047	1.19	0.98	0.69
Beets	0.004	0.10	0.08	0.06
Pepper	0.001	0.02	0.01	0.09
Tomato	0.00009	0.002	0.002	0.001
Broccoli	0.0003	0.008	0.006	0.004
Cabbage	0.0003	0.007	0.006	0.004
Cauliflower	0.0003	0.007	0.006	0.004
Collards	0.0004	0.01	0.008	0.006
Kale	0.021	0.01	0.01	0.007
Mustard greens	0.004	0.10	0.08	0.06
Brussels Sprouts	0.0002	0.005	0.004	0.003
Spinach	0.017	0.43	0.35	0.25
Melons-water	0.001	0.01	0.01	0.007
Melons-musk	0.001	0.02	0.02	0.01
Melons-cantaloupe	0.001	0.03	0.02	0.02
Squash	0.001	0.02	0.02	0.01
Cucumber	0.001	0.02	0.02	0.01
Onion	0.01	0.25	0.20	0.15
Radish	0.005	0.13	0.10	0.07
Potato	0.48	12.04	9.90	7.04
Turnip	0.0009	0.02	0.02	0.01
Grass/Forage/Fodder/Hayes Grown for Seed 2" Incorporation	0.37	4.67	3.84	2.73
Grass Seed Bed Treatment[1] 3" incorporation	2.17	18.25	15.02	10.62

(1) This use is not a seed treatment use but it was modeled similar to seed treatment in GENEEC to account for the 3" incorporation depth.