Appendix C

Summary of Ecotoxicity Data for Warfarin

Table C-1. Freshwater Fish Acute Toxicity of Warfarin					
Species[1,2]	**% a.i.**	**96-hour LC_{50} (mg a.i./L)**	**Toxicity Category**	**MRID No.**	**Study Classification**
Lepomis macrochirus (Bluegill sunfish)	Tech.	LC_{50} = 750 ppm NOAEC = 560 ppm	Practically nontoxic	117976	Acceptable
Salmo gairdneri (Rainbow trout)	Tech.	LC_{50} > 1000 ppm	Practically nontoxic	117977	Acceptable
Lepomis macrochirus (Bluegill sunfish)	100	LC_{50} = 300 ppm NOAEC = 180 ppm	Practically nontoxic	153363	Acceptable
Salmo gairdneri (Rainbow trout)	100	LC_{50} = 730 ppm NOAEC > 100 ppm	Practically nontoxic	153364	Acceptable
Salmo gairdneri (Rainbow trout)	100	LC_{50} > 1000 mg/L	Practically nontoxic	156286	Acceptable
Lepomis macrochirus (Bluegill sunfish)	100	LC50 = 88 ppm	Slightly toxic	156287	Acceptable
Salmo gairdneri (Rainbow trout)	0.54	LC_{50} > 10,000 ppm	Practically nontoxic	40098001	Supplemental

Table C-2. Freshwater Invertebrate Acute Toxicity of Warfarin					
Species	**% diquat cation**	**48-hour EC_{50} (mg/L)**	**Toxicity Category**	**MRID No. Author, Year**	**Study Classification**
Daphnia magna	Tech.	LC_{50} = 72 ppm	Slightly toxic	117975	Supplemental
Daphnia magna	100	LC_{50} > 17 mg/L	Slightly toxic	153368	Acceptable
Daphnia magna	100	LC_{50} = 130 mg/L	Practically nontoxic	156288	Supplemental

Table C-3: Avian Acute Toxicity to Warfarin					
Species	**% A.I.**	**Toxicity Endpoint**	**Toxicity Classification**	**MRID**	**Status**
Acute Single Oral Dose					
Bobwhite quail (*Colinus virginianus*)	100	LD_{50} >2000 mg/kg	Practically nontoxic	156284	Acceptable
Bobwhite quail (*Colinus virginianus*)	100	LD_{50} > 2150 mg/kg	Practically nontoxic	153369	Acceptable
Anas platyrhynchos (Mallard)	Tech.	LD_{50} = 621 mg/kg	Moderately toxic	248782	Acceptable
Anas platyrhynchos (Mallard)	10	LD_{50} = 120 mg/kg	Highly toxic	5005716	Supplemental
Acute Dietary					
Anas platyrhynchos (Mallard)	Tech.	LC_{50} = 4467 ppm	Practically nontoxic	117978	Invalid
Colinus virginianus (Bobwhite quail)	Tech.	LC_{50} = 3000 ppm	Practically nontoxic	117979	Supplemental
Colinus virginianus (Bobwhite quail)	100	LC_{50} = 625 ppm	Moderately toxic	153365	Acceptable
Anas platyrhynchos (Mallard)	100	LC_{50} = 890 ppm	Moderately toxic	153366	Acceptable
Colinus virginianus (Bobwhite quail)	100	LC_{50} = 6690 ppm	Practically nontoxic	156283	Supplemental
Anas platyrhynchos (Mallard)	100	LC_{50} > 5000 ppm	Practically nontoxic	156285	Supplemental
Anas platyrhynchos (Mallard)	Tech.	LC_{50} = 1726 ppm	Practically nontoxic	157812	Acceptable
Colinus virginianus (Bobwhite quail)	100	LC_{50} = 3900 ppm	Practically nontoxic	161724	Acceptable

Table C-4: Mammalian Acute Toxicity to Warfarin					
Test Type	**% A.I.**	**Toxicity Endpoint**	**Toxicity Classification**	**MRID**	**Status**
Acute (gavage) Laboratory rat *Rattus norvegicus*	100	LD_{50} = 3.0 mg a.i./kg-bw (male)	Very highly toxic	05002272 GS 0011-107	Acceptable
Acute gavage Cat (*Felis catus*)	100	LC_{50} = 2.5-20 mg/kg	Very highly to highly toxic	00002461	Acceptable
Dietary (5-day exposure) Laboratory rat *Rattus norvegicus*	100	LC50 = 4.41 ppm	Very highly toxic	Teeters 1981 (TNM 126)[a]	Supplemental
Dietary (15-day exposure) Black-tailed prairie dogs (*Cynomys ludovicians*)		LC_{50} = 97 mg/kg	Highly toxic	Mach et al. 2002	Qualitative

[a] Tetters, W.R (1981) Warfarin technical: Toxicity to Laboratory Rat: Test No. 126. (U.S. Environmental Protection Agency, pesticides Regulation Div., Agricultural Research Center, Animal Biology Laboratory, unpublished report)

Table C-5: Secondary Toxicity to Warfarin				
Species	**Prey offered to birds**	**Affected Endpoints**	**MRID**	**Status**
Strix aluco (Tawny owl)	Phase 1- mice fed sodium warfarin treated wheat for 3 days Phase 2- mice orally dosed with 0.54 mg or 0.27 mg sodium warfarin per 0.1 mL of water	Decreased prothrombin levels	J004518 Townsend et al. 1981	Acceptable
Pica pica (Black-billed magpie)	Rats fed warfarin bait at 549 ppm for a maximum of 7 days	No signs of anticoagulant poisoning	MRID 44995004	Supplemental