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MEMORANDUM

SUBJECT: **Naphthalene Acetates** Occupational and Residential Exposure Assessment for the Reregistration Eligibility Decision (RED) Document
Reregistration Case 0379

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This document describes the occupational and residential exposure and risk assessment for Naphthalene Acetates. This document has been revised to address comments submitted by AMVAC on February 22, 2004.

03/04

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1.0 EXECUTIVE SUMMARY

1.1 Background and Purpose

A regulatory review of occupational and residential exposure to naphthalene acetates (1-Naphthaleneacetic acid (NAA), its salts, ester, and acetamide) was conducted for this RED because there is potential exposure to occupational and residential handlers during handling and application of NAA and/or to workers entering treated sites after its application.

1.2 Use Patterns and Formulations

1-Naphthaleneacetic acid (NAA), its salts, ester, and acetamide are plant growth regulators which are collectively referred to as naphthalene acetates. They are currently registered for use on various orchard and fruit crops (including apple, cherry, olive, orange, pear, tangelo, and tangerine) and on ornamental trees. Naphthalene acetates are used to stimulate growth, delay flower induction and leaf drop, prevent preharvest fruit drop, thin fruit, and control sprout formation.

The registered formulation classes of naphthalene acetates include dust, wettable powder, flowable concentrate, emulsifiable concentrate, soluble concentrate, and liquid ready-to-use. Thinning and stop drop formulations containing NAA or its ammonium, potassium, or sodium salts are applied using ground spray or aerial equipment. Sprout formation control formulations containing the acetamide of NAA are applied by hand held sprayer and paint brush. NAA containing products used to stimulate root growth are applied as a dilute root dip or soil drench. Only short term exposures from inhalation and dermal exposure routes are expected based on use patterns. Max application rates for thinning and fruit drop control are 0.11 lb a.i./acre. NAA sprout control products are applied a maximum rate of 0.10 lb a.i./gal.

1.3 Hazard Identification

The Toxicology Chapter for the naphthalene acetates RED identified the following toxicological endpoints of concern for NAA, its salts, ester, and acetamide (TXR No.0052146, A. Khasawinah, 11/20/03). A NOAEL of 300 mg/kg/day was selected for short-term dermal exposure based on reduced body weight gain and food efficiency at the LOAEL of 1000 mg/kg/day. Due to a lack of inhalation studies, an endpoint from an oral prenatal developmental study in rats was selected for inhalation risk assessments. A NOEL for maternal toxicity of 50 mg/kg/day was selected for short-term inhalation exposure based on decreased body weight gain during the compound administration at 250 mg/kg/day. An absorption factor of 100% is applied for inhalation exposures. The target margin of exposure (MOE) for dermal and inhalation exposures is 100 based on uncertainty factors of 10x for intraspecies variability, 10x for interspecies variation.

A published NCI carcinogenicity study of NAA acetamide in mice and a guideline chronic/oncogenicity of Na NAA in rats study are considered adequate for the evaluation of the oncogenicity of the NAA group. In these two studies the tested NAA compounds were not carcinogenic in mice or rats.

For short-term exposure risk assessments, the dermal and inhalation exposure routes can be combined due to the common toxicity endpoint (reduced body weight gain) via the dermal and inhalation (oral equivalent) routes.

Relatively few incidents of illness have been reported due to exposure to naphthalene acetates.

1.4 Occupational and Residential Exposure and Risk Estimates

Fifteen exposure scenarios were assessed for NAA. These include 14 occupational and one residential exposure scenario. Occupational exposure scenarios include mixing, loading, and applying NAA to fruit and ornamental trees using liquid spray and paint formulations, and post-application exposure to workers who reenter treated areas. Residential uses are limited to root dip and sprout inhibition applications. Only short term exposures from inhalation and dermal exposure routes were assessed for all exposure scenarios. Longer-term MOEs were not calculated since exposure for more than 30 days is unlikely to occur based on use patterns. Occupational and residential exposure and risk estimates were conducted using maximum application rates and surrogate exposure data from the Pesticide Handlers Exposure Database (PHED) and the Residential Exposure Assessment SOPs.

A target Margin of Exposure (MOE) of 100 is considered adequate for occupational and residential exposure via dermal and inhalation routes. The MOEs estimated for the handler exposure scenarios showed no dermal or inhalation risks of concern, i.e., all dermal MOEs are greater than the target MOE of 100, and all inhalation MOEs are greater than the target MOE of 100. Post-application dermal exposure risk assessment results indicate MOEs are not of concern (i.e., MOEs > 100) for all scenarios. The residential handler scenario assessment indicates no MOEs of concern for residential exposure (i.e., MOEs > 100).

2.0 HAZARD IDENTIFICATION

2.1 Acute Toxicology Categories

Table 1 presents acute toxicity categories outlined in the Naphthalene Acetates Toxicology Chapter.

Guideline No.	Test Chemical	MRID #(S).	Results	Toxicity Category
870.1100 Acute Oral	NAA	00103128	LD ₅₀ = 2520 mg/kg	III
	NAA acetamide	43495901	LD ₅₀ = >5000 mg/kg	IV
	NAA Na Salt	00108829	LD ₅₀ = 933-1350 mg/kg	III
	NAA Ethyl Ester	43494101	LD ₅₀ = 2186 mg/kg	III
870.1200 Acute Dermal	NAA	00103129	LD ₅₀ = > 2000 mg/kg	III
	NAA acetamide	43495902	LD ₅₀ = > 2000 mg/kg	III
	NAA Na Salt	00108829	LD ₅₀ = > 2000 mg/kg	III
	NAA Ethyl Ester	43494102	LD ₅₀ = > 2000 mg/kg	III
870.1300 Acute Inhalation	NAA	--	--	--
	NAA acetamide	43495903	LC ₅₀ = > 2.17 mg/L	IV
	NAA Na Salt	--	--	--
	NAA Ethyl Ester	43494103	LC ₅₀ = > 2.13 mg/L	IV
870.2400 Primary Eye Irritation	NAA	00103127	corrosive	I
	NAA acetamide	00103051	corrosive	I
	NAA acetamide	43495904	minimally irritating	IV
	NAA Na Salt	00108829	corrosive	I
	NAA Ethyl Ester	43494104	minimally irritating	IV
870.2500 Primary Skin Irritation*	NAA	00103127	not a skin irritant	IV
	NAA acetamide	--	--	--
	NAA Na Salt	00108829	not a skin irritant	IV
	NAA Ethyl Ester	00103053	not a skin irritant	IV
870.2600 Dermal Sensitization	NAA	00153217	not a skin sensitizer	NA
	NAA acetamide	43495905	not a skin sensitizer	NA
	NAA Na Salt	--	--	--
	NAA Ethyl Ester	43494105	not a skin sensitizer	NA

2.2 Toxicological Endpoints

The Toxicology Chapter for naphthalene acetates identified toxicological endpoints of concern for NAA. All calculations completed in this document are based on the most current toxicity information available for naphthalene acetates. Endpoints used to complete this assessment are summarized in Table 2.

Exposure Scenario	Dose Used in Risk Assessment, UF	Special FQPA SF* and Level of Concern for Risk Assessment	Study and Toxicological Effects
Acute Dietary <u>all populations</u>	NOEL = 50 mg/kg/day UF = 100 Acute RfD = 0.5 mg/kg/day	FQPA SF = N/A	Developmental - Rat: NAA LOAEL = 250 mg/kg/day based on decreased BW gain with no increase in resorptions during gestation period.

Table 2: Endpoints selected for Assessing Occupational and Residential Risks for Naphthalene Acetates			
Exposure Scenario	Dose Used in Risk Assessment, UF	Special FQPA SF* and Level of Concern for Risk Assessment	Study and Toxicological Effects
Chronic Dietary <u>all populations</u>	NOEL= 15 mg/kg/day UF = 100 Chronic RfD = 0.15 mg/kg/day	FQPA SF = N/A	Chronic Dog: NAA Na salt LOAEL = 75 mg/kg/day based on emesis, corpuscular regurgitation incidences, gross and histopathological changes in stomachs and sinusoidal histocytosis in livers in males
Incidental Oral Short-Term (1 - 30 Days): Not Applicable*			
Incidental Oral Intermediate-Term (1 - 6 Months): Not Applicable*			
Dermal Short-Term (1 - 30 days)	Dermal study NOEL= 300 mg/kg/day	FQPA SF = N/A LOC for MOE = 100	21- day dermal : NAA Na salt LOAEL = 1000 mg/kg/day based on reduced body weight gain and food efficiency
Dermal Intermediate-Term (1 - 6 Months): Not Applicable*			
Dermal Long-Term (> 6 Months): Not Applicable*			
Inhalation Short-Term (1 - 30 days)	Oral study NOAEL= 50 mg/kg/day *	FQPA SF = 1 LOC for MOE = 100	Developmental - Rat: NAA LOAEL = 150 mg/kg/day based on decreased BW gain during gestation period.
Inhalation Intermediate-Term (1 - 6 Months)*			
Inhalation Long-Term (>6 Months)*			
Cancer	Bioassay in rats and mice not carcinogenic. Not mutagenic.		

* Incidental oral, intermediate and long term exposure duration scenarios not assessed based on use patterns; inhalation absorption rate = 100%

3.0 USE PATTERNS, FORMULATIONS, APPLICATION RATES AND METHODS

Products containing NAA are intended primarily for occupational uses but there are also some minor residential uses. Naphthalene acetates are used on fruit trees to thin and prevent preharvest drop of fruits, on ornamentals to stimulate growth and delay leaf drop, and on fruit and ornamental trees to control sprouts and sucker growth on fruit and ornamental trees. Naphthalene acetates are also used to stimulate root development on bedding plants, potted plants, rooted cuttings and shrubs and trees. The majority of registered products are restricted to commercial agricultural use and are specifically labeled as “not for residential use”. Registrations for residential uses are limited to rooting compounds and sprout inhibitors.

Naphthalene acetates are typically applied as a dilute (1-2%) spray solution, and the timing of treatment vary depending on the purpose. The ethyl ester and acetamide of NAA are used early in the season to control sprout formation and fruit set (thinning), respectively. NAA or its ammonium, potassium, or sodium salts can be used either early in the season for fruit thinning or later in the season for control of fruit drop. For thinning and stop drop, naphthalene

acetates are applied at a maximum application rate of 50 g of a.i. per acre (0.11 lb a.i./acre). For sprout control the maximum application rate is 0.1 lb a.i./gal. NAA is generally applied 1-2 times per year on all registered sites. For a small percentage (1-2%) of products used for enhancement of bloom, up to four applications can be made throughout the summer months. NAA spray formulations used for thinning and stop drop are applied by ground equipment (airblast sprayer) or aurally (airplane or helicopter). NAA spray and liquid formulations used for sucker pruning and sprout inhibition are applied by hand-held sprayers or with a paint brush or roller. The percent active ingredient of registered NAA products ranges from 0.08% to 24.2%. NAA is formulated as a manufacturing product (95% a.i.) and the following formulations: dust (0.2% a.i.), emulsifiable concentrate (6.25-15.1% a.i.), wettable powder (7.1-8.4% a.i.), soluble concentrate/liquid (0.1-24.2% a.i.), ready-to-use (0.08-1.15% a.i.), flowable concentrate (0.45-1.2% a.i.), and pressurized liquid (1% a.i.). Information on registered use sites, product name, and percent a.i. is provided in Attachment 1.

4.0 INCIDENT REPORT

The following data bases have been consulted for poisoning incident data on the active ingredient Naphthaleneacetic Acid; OPP Incident Data System (IDS), Poison Control Center data (1993-1998), California Department of Pesticide Regulation Pesticide Illness Surveillance Program (PISP) (1982-2001), National Pesticide Telecommunications Network (NPTN). Relatively few incidents of illness have been reported due to naphthaleneacetic acid. The only reliable information was reported through the California PISP. Over a 20 year period there were just 15 individuals reporting effects as a result of 7 incidents. One incident involved seven people who reported a number of symptoms such as headache, nausea, abdominal pain, burning eyes and throat. Most of the individual cases reported skin or eye effects resulting from inadvertent exposure. The use of this product inside walls that vent in to occupied rooms appears to pose a hazard due the offensive odor. None of these cases were hospitalized, but a few took time off from work due to their illness. (D293397, J. Blondell, M. Spann, 10/9/03)

5.0 RESIDENTIAL EXPOSURE AND RISK ASSESSMENT

5.1 Residential Handler Exposure Scenario

Residential uses are limited to application of NAA to stimulate root growth and application of the ethyl ester of NAA to control sprouts and sucker growth on fruit and ornamental trees. Only the spray application of naphthalene acetates to control sprout and sucker growth was evaluated for the residential exposure assessment. Residential exposures from root dip applications are expected to be significantly less than spray applications for sucker growth because of the low concentration of NAA in root dip and soil drench products, and the very short exposure duration and limited area of exposure associated with use of these products. Only short term exposures are expected for residential applications of naphthalene acetates. No chemical specific exposure data was available for naphthalene acetates. Therefore surrogate dermal and inhalation exposure data from HED's SOP for Residential Exposure Assessments was used to

assess residential exposure from aerosol spray application of naphthalene acetates to control tree sprouts.

5.2 Residential Handler Exposure Assumptions

The following exposure assumptions were using in estimating risks to residential handlers from exposure to naphthalene acetates.

- Average body weight of an adult handler is 70 kg/day.
- Maximum application rate for aerosol spray application is 0.1 lb. a.i./gal.
- Amount treated for aerosol spray application is 0.25 gal/day.
- Residential handlers are expected to have a short-term exposure duration (less than 30 days).
- No protective clothing was factored into the assessment for residential handler exposure/risk scenarios. Clothing assumptions include short pants, short-sleeved shirt, and no gloves.

5.3 Residential Handler Exposure and Risk Estimates

Estimates of exposure and risk from residential use of naphthalene acetates to control sprout growth on trees are presented in Table 3. A target MOE of 100 for the dermal and inhalation routes is considered adequate for the residential handler risk assessment. Both dermal and inhalation MOEs for the residential exposure scenario are well above the target MOE of 100 and not of concern.

Exposure Scenario	Dermal Unit Exp (mg/lb ai) ¹	Inhalation Unit Exp (Ug/lb ai) ²	Crop ³	Applic Rate ⁴	Daily Area Treated ⁵	Dermal Dose (mg/kg/day) ⁶	Dermal MOE ⁷	Inhal Dose (mg/kg/day) ⁸	Inhal MOE ⁹	Agg MOE
Aerosol application	220	2400	sprout inhibitor	0.10 lb ai/gal	0.25 Gal/day	0.079	3800	0.00086	58000	3600

¹Baseline dermal unit exposures represent long pants, long sleeved shirts, shoes, and socks. Values are reported in the PHED Surrogate Exposure Guide dated August 1998 or are from data submitted by the Outdoor Residential Exposure Task Force dated May 2000.

²Baseline inhalation unit exposures represent no respirator. Values are reported in the PHED Surrogate Exposure Guide dated August 1998 or are from data submitted by the Outdoor Residential Exposure Task Force dated May 2000.

³Crops and use patterns are from label for residential application of sprout inhibitor product

⁴Application rates are based on maximum values found in various sources including LUIS and various labels.

⁵Amount treated is based on the area or gallons that can be reasonably applied in a single day for each exposure scenario of concern based on the application method and formulation/packaging type.

⁶Dermal dose (mg/kg/day) = [unit exposure (mg/lb ai) * Dermal absorption (100%) * Application rate (lb ai/acre or lb ai/gallon) * Daily area treated (acres or gallons)] / Body weight (70 kg).

⁷Dermal MOE = dermal NOEL(300 mg/kg/day) / Daily Dermal Dose. Target Dermal MOE is 100.

⁸Inhalation dose (mg/kg/day) = [unit exposure (ug/lb ai) * 0.001 mg/ g unit conversion * Inhalation absorption (100%) * Application rate (lb ai/acre or lb ai/gallon) * Daily area treated (acres or gallons)] / Body weight (70 kg).

⁹Inhalation MOE = inhalation NOEL (50 mg/kg/day) / Daily Inhalation Dose. Target Inhalation MOE is 100.

6.0 OCCUPATIONAL HANDLER AND POST-APPLICATION EXPOSURE & RISK

Only short-term exposures are expected/assessed for occupational exposure scenarios. No chemical-specific handler or post-application exposure data have been submitted by the registrant. Therefore, an exposure assessment for each handler scenario was developed using PHED Version 1.1 and HED SOPs for agricultural exposure. PHED was designed by a task force of representatives from the US. EPA, Health Canada, the California Department of Pesticide Regulation, and members of the American Crop Protection Association. PHED is a software system consisting of two parts; 1) a database of measured exposure values for workers involved in the handling of pesticides under actual field conditions, and 2) a set of computer algorithms used to subset and statistically summarize the selected data. Currently, the database contains values for over 1,700 monitored individuals.

6.1 Handler Exposure Assessment

6.1.1 Occupational Handler Exposure Scenarios

The term "handler" applies to individuals who mix, load, and apply the pesticide product. Based on actively registered labels, HED assessed the following scenarios for the naphthalene acetates RED:

- 1) mixing and loading for airblast application aerial sprayer
- 2) mixing and loading for rights of way sprayer
- 3) mixing and loading for aerial sprayer
- 4) aerial application of liquid spray
- 5) application of liquid by air blast sprayer
- 6) application of liquid by rights-of-way sprayer
- 7) paintbrush application of liquid
- 8) spray application with high pressure handwand
- 9) mixing, loading and applying liquids with low pressure handwand;
- 10) mixing, loading and applying liquids with backpack sprayer
- 11) mixing, loading and applying liquids with paintbrush
- 12) flagging for aerial spray application

6.1.2 Occupational Handler Exposure Assumptions

The following exposure assumptions were using in estimating risks to occupational handlers from exposure to naphthalene acetates.

- Average body weight of an adult handler is 70 kg/day.
- Maximum application rate for airblast and aerial application is 0.11 lb a.i./acre (50 g a.i./acre)
- Maximum application rate for all other spray applications is 0.1 lb a.i./gal

- Maximum area treated is 500 acres/day for aerial and 40 acres/day for airblast spray application (based on data submitted by the registrant)
- exposure duration is short-term (less than 30 days)
- Baseline dermal and inhalation exposure (long pants, long sleeved shirts, shoes, and socks, no respiratory protection)

6.1.3 Occupational Handler Exposure and Risk Estimates

Estimates of occupational handler exposure and risk from use of naphthalene acetates are presented in Table 4. A target MOE of 100 for the dermal and inhalation routes is considered adequate for the occupational handler risk assessment. Both dermal and inhalation MOEs for the occupational handler exposure scenarios are above the target MOE of 100 and not of concern. Dermal MOEs are ≥ 130 for all scenarios and inhalation MOEs are $\geq 22,000$ for all scenarios.

Table 4. Occupational Handler Exposure Scenarios - NAA, salt, esters, acetamides Target MOE = 100										
Exposure Scenario (Scenario #)	Dermal Unit Exp (mg/lb ai) ¹	Inhal Unit Exp (ug/lbai) ²	Crop ³	Applic Rate ⁴	Daily Area Treated ⁵	Dermal Dose (mg/kg/day) ⁶	Derm MOE ⁷	Inhal Dose (mg/kg/day) ⁸	Inhal MOE ⁹	Agg MOE ¹⁰
Mixer/Loader										
Mixing/Loading Liquids for Airblast application (1)	2.9	1.2	apples & pears	0.11 lb ai/acre	40 Acres per day	0.18	1600	0.000075	660000	1600
Mixing/Loading Liquids for Rights-of-Way Sprayer & HPHW (2)	2.9	1.2	sprout inhibitor	0.10 lb ai/acre	20 Gal per day	0.083	3600	0.000034	1500000	3600
Mixing/Loading Liquids for Aerial Spray (3)	2.9	1.2	apples & pears	0.11 lb ai/acre	500 Acres per day	2.3	130	0.00094	53000	130
Applicator										
Aerial Spray Engineering Controls(4)	0.005	0.068	apples & pears	0.11 lb ai/acre	500 Acres per day	0.0039	76000	0.000053	940000	70000
Airblast Spray (5)	0.36	4.5	apples & pears	0.11 lb ai/acre	40 Acres per day	0.023	13000	0.00028	180000	12000
Rights-of-Way Sprayer (6)	1.3	3.9	sprout inhibitor	0.10 lb ai/acre	20 Gal per day	0.037	8100	0.00011	450000	8000
Paintbrush (7)	180	280	sprout inhibitor	0.10 lb ai/gal	2 Gal per day	0.51	580	0.0008	63000	570
High-Pressure HandWand Sprayer (8)	1.8	79	sprout inhibitor	0.10 lb ai/gal	20 Gal per day	0.051	5800	0.0023	22000	4600
Mixer/Loader/App										
Low Pressure Handwand (9)	100	30	sprout inhibitor	0.10 lb ai/ gal	5 Gallons per day	0.71	420	0.00021	230000	420
Backpack sprayer(10)	2.5	30	sprout inhibitor	0.10 lb ai/ gal	0.5 Gal per day	0.0018	170000	0.000021	2300000	160000

Table 4. Occupational Handler Exposure Scenarios - NAA, salt, esters, acetamides Target MOE = 100

Exposure Scenario (Scenario #) Base Line PPE	Dermal Unit Exp (mg/lb ai)	Inhal Unit Exp (ug/lbai) ²	Crop ³	Applic Rate ⁴	Daily Area Treated ⁵	Dermal Dose (mg/kg/day) ⁶	Derm MOE ⁷	Inhal Dose (mg/kg/day) ⁸	Inhal MOE ⁹	Agg MOE ¹⁰
Paintbrush application (11) ¹¹	2.9 mix/load	1.2	sprout inhibitor	0.10 lb ai/gal	2 Gal per day	0.6	500	0.00083	60000	500
	180 apply	280								
Flagger										
Flagging for Spray application (12)	0.011	0.35	apples & pears	0.11 lb ai/acre	400 Acres per day	0.0069	43000	0.00022	230000	36000

¹Baseline dermal unit exposures represent long pants, long sleeved shirts, shoes, and socks. Values are reported in the PHED Surrogate Exposure Guide dated August 1998

²Baseline inhalation unit exposures represent no respirator. Values are reported in the PHED Surrogate Exposure Guide dated August 1998

³Crops and use patterns are from labels and information submitted by the registrant

⁴Application rates are based on maximum values found in various sources including LUIS and various labels.

⁵Amount treated is based on the area or gallons that can be reasonably applied in a single day for each exposure scenario of concern based on the application method and formulation/packaging type. (Standard EPA/OPP/HED values).

⁶Dermal dose (mg/kg/day) = [unit exposure (mg/lb ai) * Dermal absorption (100%) * Application rate (lb ai/acre or lb ai/gallon) * Daily area treated (acres or gallons)] / Body weight (70 kg).

⁷Dermal MOE = dermal NOEL(300 mg/kg/day) / Daily Dermal Dose. Target Dermal MOE is 100.

⁸Inhalation dose (mg/kg/day) = [unit exposure (ug/lb ai) * 0.001 mg/g unit conversion * Inhalation absorption (100%) * Application rate (lb ai/acre or lb ai/gallon) * Daily area treated (acres or gallons)] / Body weight (70 kg).

⁹Inhalation MOE = inhalation NOEL (50 mg/kg/day) / Daily Inhalation Dose. Target Inhalation MOE is 100.

¹⁰ Agg MOE = 1/(1/inhalMOE + 1/dermMOE)

¹¹ Mixer/loader exposure data for paint brush applicator is not available in PHED. Therefore, the mixer/loader/applicator scenario for paint brush application combines mixer/loader exposure from rights-of-way spray application plus applicator exposure for paint brush application.

6.2 Post Application Exposure Assessment

6.2.1 Post Application Exposure Scenarios

HED uses the term “post-application” to describe individuals who can be exposed to pesticides after entering areas previously treated with pesticides and performing certain activities (also often referred to as reentry exposure). Occupational post-application activities were assessed for apple and pears, the crops with the highest application rates. Based on actively registered labels, HED assessed the following scenarios for the naphthalene acetates RED;

- 1) irrigation, scouting, and weeding, and
- 2) harvesting, pruning, propping, training, and thinning.

6.2.2 Post Application Exposure Assumptions

The following exposure assumptions were using in estimating risks from post application exposure to naphthalene acetates.

- Average body weight of an adult handler is 70 kg/day.
- Maximum application rate for airblast and aerial application is 0.11 lb a.i./acre (50 gm a.i./acre)
- Dislodgeable foliar residue is 20% of the application rate (HED Standard assumption)
- Dermal transfer coefficient of 1000 was used for irrigation, scouting and weeding DTC of 3000 was used for harvesting, pruning, propping and thinning. DTCs are based on HED's SOP on agricultural transfer coefficients.
- Negligible NAA inhalation exposure is anticipated for post-application exposure due to dilution of vapor outdoors.
- Post-application exposure is assessed on the same day the pesticide is applied (day 0). The reentry interval for post-application activities for most labels is 12-48 hours.

6.2.3 Post-application Exposure and Risk Estimates

Estimates of exposure and risk from post-application exposure to naphthalene acetates are presented in Table 5. A target MOE of 100 for the dermal and inhalation routes is considered adequate for the residential handler risk assessment. Dermal MOEs for post-application exposure scenarios are well above the target MOE of 100 and not of concern.

Exposure Scenario (Scenario #)	Crop ¹	Applic Rate (lb ai/Acre) ²	Dislodgeable Foliar Residue ³ (ug/cm ²)	Dermal Transfer Coefficient ⁴	Dermal Dose (mg/kg/day) ⁵	Dermal MOE ⁶
Irrigation, Scouting, Weeding (1)	deciduous fruit	0.11	0.25	1000	0.028	11000
Harvesting, Pruning, Propping, Training, and Thinning (2)	deciduous fruit	0.11	0.25	3000	0.085	3500

¹Crops and use patterns are from labels and information submitted by the registrant

²Application rates are based on maximum values found in LUIS, labels & registrant data submissions

³Dislodgeable Foliar Residue (DFR) = 20% of application rate -Standard EPA/OPP/HED value based on large body of DFR data available for agricultural crops

⁴Dermal Transfer Coefficient (DTC) - Standard EPA/OPP/HED value based on Agricultural Reentry Task Force (ARTF) data

⁵Daily Dose = (DFR x 0.0001 mg/ug x DTC x Exposure Time (8 hrs)/Body weight

⁶Dermal MOE = Dermal NOEL(300 mg/kg/day) / Daily Dermal Dose. Target Dermal MOE is 100.

7.0 UNCERTAINTIES AND RISK CHARACTERIZATION

The occupational and residential exposure assessment conducted for Naphthalene Acetates RED is a highly conservative assessment intended to encompass all of the major uses throughout the country. Chemical specific exposure studies are unavailable for the handler and post-application exposure so HED default exposure values and assumptions were used. HED default exposure values and assumptions are selected to be realistic and yet provide a reasonable certainty that the exposures are not underestimated. High-end assumptions were used for area treated for handlers. High transfer coefficients were used for post-application activities and exposure on day 0 (day of application) was assumed. Application rates used in handler and post-application

occupational assessment are the maximum allowable based on data submitted by the registrant. Baseline exposure assumptions were used for all handler exposure scenarios for this assessment. Most labels require minimum PPE of coveralls, socks, and waterproof gloves and shoes for handlers. Maximum label application rates were based on data provided by the registrant. Many of the active labels for use of naphthalene acetates for plant growth control do not provide clear information on application rates. These labels need to be revised to clearly reflect the maximum allowable application rate submitted by the registrant.

Attachment 1 - Label Data

PC Code 056001				
Reg.No	%AI	Form	Product Name	Crop/Site
000264-00499	0.2	D	Rootone F Brand Rooting Hormone	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Woody Shrubs And Vines
005481-00426	8.4	WP	Amid-thin-w	Apple Pear
005481-00473	1.2	FIC	Amcotone	Apple Pear

PC Code 056002				
Reg.No	%AI	Form	Product Name	Crop/Site
005481-00337	0.11	SC/L	Alco Vitamin B-1 Hormone Concentrate	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Woody Shrubs And Vines
005481-00473	0.45	FIC	Amcotone	Apple Pear
005887-00169	0.1	SC/L	Black Leaf Vitamin B1 Solution	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Nonflowering Plants Ornamental Woody Shrubs And Vines
007401-00337	0.1	SC/L	Hi-yield Vitamin B1	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Nonflowering Plants Ornamental Woody Shrubs And Vines
008002-00001	0.04	SC/L	Liquinox Start	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Woody Shrubs And Vines
034704-00756	0.1	SC/L	Transplant Starter	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Woody Shrubs And Vines
043905-00001	0.66	SC/L	Wood's Rooting Compound	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Woody Shrubs And Vines
064388-00001	0.5	SC/L	Dip'n Grow	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Woody Shrubs And Vines
068719-00002	0.08	RTU	Vita Grow Ready To Use Rooting Compound	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Woody Shrubs And Vines
068719-00003	0.76	SC/L	Vita Grow Concentrated Rooting Compound	Ornamental And/or Shade Trees Ornamental Herbaceous Plants Ornamental Woody Shrubs And Vines
072639-00011	0.2	SC/L	Goldengro Tm R	Ornamental And/or Shade Trees Ornamental Ground Cover Ornamental Herbaceous Plants Ornamental Nonflowering Plants Ornamental Woody Shrubs And Vines

PC Code 056003				
Reg.No	%AI	Form	Product Name	Crop/Site
005481-00413	24.2	SC/L	K-salt Fruit Fix 800	Apple Citrus Hybrids Other Than Tangelo Holly (Shelterbelt) Olive Orange Pear Tangelo Tangerines
005481-00414	6.25	EC	K-salt Fruit Fix 200	Apple Citrus Hybrids Other Than Tangelo Olive

PC Code 056003				
Reg.No	%AI	Form	Product Name	Crop/Site
				Orange
				Ornamental Woody Shrubs And Vines
				Pear
				Tangelo
				Tangerines
005481-00428	24.2	SC/L	Naa - 800	Apple
				Apple
				Pear
005481-00496	6.25	SC/L	Snaap-2	Apple
				Citrus Hybrids Other Than Tangelo
				Olive
				Orange
				Ornamental Woody Shrubs And Vines
				Pear
				Tangelo
				Tangerines
005481-00497	24.2	SC/L	Snaap-2	Apple
				Citrus Hybrids Other Than Tangelo
				Olive
				Orange
				Ornamental Woody Shrubs And Vines
				Pear
				Tangelo
				Tangerines

PC Code 056004				
Reg.No	%AI	Form	Product Name	Crop/Site
005481-00066	5.68	SC/L	Alco Olive Stop Prevents Fruiting Of Olive Trees	Olive
				Pear
				Plum
005481-00129	5.68	SC/L	Fruit Fix Concentrate 200	Apple
				Olive
				Pear
005481-00130	21.4	SC/L	Fruit Fix Super Concentrate 800	Apple
				Olive
				Orange
				Ornamental And/or Shade Trees
				Pear
				Tangelo
				Tangerines
034704-00382	5.68	SC/L	Liqui-stik Concentrate	Apple
				Olive
				Pear

PC Code 056007				
Reg.No	%AI	Form	Product Name	Crop/Site
005481-00427	3.5	SC/L	Fruitone-n	Apple
				Pear
034704-00360	7.1	WP	Stik	Apple
				Ornamental And/or Shade Trees
				Pear

PC Code 056008				
Reg.No	%AI	Form	Product Name	Crop/Site
005481-00429	15.1	EC	Tre-hold Sprout Inhibitor A112	Apple
				Olive
				Ornamental And/or Shade Trees
				Ornamental Woody Shrubs And Vines
				Pear
005481-00434	1.15	SC/L	Tre-hold Sprout Inhibitor For Citrus	Apple
				Citrus
				Nectarine
				Olive

PC Code 056008				
Reg.No	%AI	Form	Product Name	Crop/Site
				Ornamental And/or Shade Trees
				Ornamental Woody Shrubs And Vines
				Pear
005481-00452	1.15	RTU	Tre-hold Rtu	Apple
				Citrus
				Nectarine
				Ornamental And/or Shade Trees
				Ornamental Woody Shrubs And Vines
				Pear
005481-00459	1.15	RTU	Prune Smart Sprout Inhibitor	Apple
				Olive
				Ornamental And/or Shade Trees
				Ornamental Woody Shrubs And Vines
				Pear
005481-00460	1.15	RTU	Tre-hold Sprout Inhibitor For Lawn & Residential Use	Apple
				Citrus
				Olive
				Ornamental And/or Shade Trees
				Ornamental Woody Shrubs And Vines
				Pear
007401-00387	1	PRL	Ferti-lome Pruning Sealer	Ornamental And/or Shade Trees
				Ornamental Woody Shrubs And Vines



13544

R099978

Chemical: 1-Naphthaleneacetamide; 1-Naphthaleneacetic acid; Potassium
1-naphthaleneacetate; Ammonium 1-naphthaleneacetate; Sodium
1-naphthaleneacetate; Ethyl 1-naphthaleneacetate
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