California Department of Food and Agriculture
Statewide Plant Pest Prevention and Management Program

Ecological Risk Assessment

Urban/Residential and Nursery Treatments, Pierce's Disease Control Program

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LIST OF ABBREVIATIONS

A.....Applicator
Ac.....Acre
ACP.....Asian Citrus Psyllid
a.i.....Active Ingredient
AI .....Acute Intake
AIUF .....Aquatic Invertebrate Uptake Factor
ATSDR .....Agency for Toxic Substances Disease Registry
AUF.....Area Use Factor
BCF .....Bioconcentration Factor
BMF .....Biomagnification Factor
BMP .....Best Management Practices
bw.....Body Weight
CDFA .....California Department of Food and Agriculture
CF.....Conversion Factor
CSM .....Conceptual Site Model
DFR.....Dislodgeable Foliar Residue
DL .....Detection Limit
DPR.....California Department of Pesticide Regulation
DSD.....Droplet Size Distribution
DTSC .....California Department of Toxic Substances Control
dw.....Dry Weight
EC, E .....Emulsifiable Concentrate
EDD .....Estimated Daily Dose
EEC.....Estimated Environmental Concentration
EIR .....Environmental Impact Report
ERA.....Ecological Risk Assessment
ESU .....Evolutionary Significant Units
ET.....Exposure Time
EXAMS.....Exposure Analysis Modeling System
EXPRESS .....EXAMS-PRZM Exposure Simulation Shell
F .....Flowable

FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FIR	Food Intake Rate
GRAS	Generally Recognized As Safe
GWSS	Glassy-Winged Sharpshooter
HHRA	Human Health Risk Assessment
IGR	Insect Growth Regulator
IPC	Integrated Pest Control
IRIS	Integrated Risk Information System
I_{rs}	Soil Ingestion Rate
IRV	Vegetation Ingestion Rate
KABAM	K_{ow} Aquatic BioAccumulation Model
K_d	Soil-Water Partition Coefficient
K_{oa}	Octanol-Air Partition Coefficient
K_{oc}	Organic Carbon Absorption Coefficient
K_{ow}	Octanol-Water Partition Coefficient
LBAM	Light Brown Apple Moth
LO(A)EL/LOAEL	Lowest Observable (Adverse) Effect Level
LOC	Level of Concern
LOEC	Lowest Observable Effect Concentration
MAT	Male Attractant Technique
MCL	Maximum Contaminant Level
Merit 2F Assessment	Statewide Plant Pest Prevention and Management Program EIR (PEIR) – Addendum No. 1, SCH # 2011062057
MW	Molecular Weight
NA	Not Applicable
NDA	No Data Available
NO(A)EL/ NO(A)EL	No Observable (Adverse) Effect Level
NOC	Not of Concern
NOEC	No Observable Effect Concentration
NRCS	National Resources Conservation Service
NWI	Normalized Water Intake Rate
OEHHA	Office of Environmental Health Hazard Assessment

PDCP	Pierce's Disease Control Program
PDEP-D	Pest Detection/Emergency Projects - Detection
PE5	PRZM-EXAMS Model Shell Version 5.0
PEIR	Programmatic Environmental Impact Report
PHI	Pre-Harvest Intervals
PRZM	Pesticide Root Zone Model
PUR	Pesticide Use Reporting
PWC	Pesticide in Water Calculator
RED	Reregistration Eligibility Decision
REI	Restricted Entry Interval
RQ	Risk Quotient
S	Solution
SC	Suspension Concentrate
SCLP	Straight Chain Lepidopteran Pheromone
SG	Water Soluble Granule
SL	Slurry
SLN	Special Local Needs
SPLAT	Specialized Pheromone and Lure Application Technology
Statewide PEIR	Statewide Plant Pest Prevention and Management Program, Environmental Impact Report, Volume 2 - Appendix A, Ecological Risk Assessment, SCH # 2011062057
TGAI	Technical grade of the active ingredient
T-REX	Terrestrial Residue Exposure
TRV	Toxicity Reference Value
TWA	Time Weighted Average
UE	Unit Exposure
UF	Uncertainty Factor
UH	Upland Hydrology
ULV	Ultra Low Volume
USEPA	U.S. Environmental Protection Agency
VADOFT	Vadose Zone Fate and Transport Model
VFSMOD-W	Vegetative Filter Strip Modeling System

VUF.....Vegetation Uptake Factor
WHO.....World Health Organization
WI .....Water Intake Rate
WP.....Wettable Powder
WSP .....Water Soluble Packet

1 Executive Summary

This Ecological Risk Assessment (ERA) is conducted as an addition to the ERA conducted as part of the Statewide PEIR. Eight new alternative scenarios for soil or foliar applications with Safari® 20 SG, Merit® 2F, or Marathon® II Greenhouse and Nursery Insecticide for the control of glassy-winged sharpshooters were assessed. A ninth alternative scenario was not assessed directly but is discussed as being equivalent to one of the assessed eight alternative scenarios. The methods used in this risk assessment largely follow those methods used in the previous risk assessment in the Statewide PEIR. Where methods differ, the new assumptions or receptors are discussed.

The application of Safari 20 SG could occur in nursery loading docks or nursery production area settings with foliar applications made to containerized host plants using a mechanically pressurized sprayer, hydraulic sprayer, backpack sprayer, boom sprayer, and/or aerial application via aircraft. Marathon II Greenhouse and Nursery Insecticide can be applied in nursery loading dock or nursery production area settings with foliar applications made to containerized host plants using a mechanically pressurized sprayer, hydraulic sprayer, or backpack sprayer. Whereas, Merit 2F applications could be made to host plants as foliar, soil drench, or soil injection applications in urban/residential setting using a mechanically pressurized sprayer and/or backpack sprayer.

Similar methods were used to identify toxicity endpoints as were used for the Statewide PEIR. Similar surrogate species were used as in the Statewide PEIR, but chronic effects on insects such as the honey bee were added to the assessment since new assessment methods have been developed. Updated USEPA models such as the Pesticide in Water Calculator (PWC) were used in an effort to employ the most current methods and models available.

The ERA relied upon the three-stage process for risk assessments: problem formulation, analysis, and risk characterization. In the problem formulation phase, CDFA and its risk assessment team consulted with DPR and OEHHA to determine the appropriate scenarios to assess, models to evaluate exposure, default data assumptions, and appropriate toxic effects based on scientific literature. The problem formulation stage concluded with a CSM that identified the complete exposure pathways carried forward in the analysis based on available information. During the analysis phase of the ERA, detailed exposure was estimated with models incorporating appropriate data and conservative assumptions. Also in the analysis phase, effect values were developed that incorporated the toxicity properties of the chemicals along with safety factors to address uncertainty. The risk characterization phase provided conclusions on the potential for adverse effects to occur to ecological receptors. The risk characterization phase utilized both a quantitative and qualitative assessment. If the estimated Risk Quotient (RQ) was below the Level of Concern (LOC), it was concluded that the potential for adverse effects is low. If the estimated RQ was above the LOC, a qualitative assessment was conducted to incorporate information that the quantitative models are not capable of considering appropriately.

Where the quantitative assessment indicated the RQ was below the LOC, it was concluded that the potential for adverse effects was low. When the RQ was above the LOC, applying several qualitative considerations typically result in a conclusion that the potential for adverse effects

would be low. This includes an assessment of the potential for species presence at an application site, incorporation of foraging range and diet, in addition to fate and transport processes such as dilution and degradation.

In the ERA, few groups of ecological receptors were found to have RQs that exceeded LOCs. These include insectivorous or omnivorous birds, mammals with aquatic or terrestrial diets, terrestrial insects, including pollinators, and aquatic invertebrates. CDFA's Best Management Practices (BMPs) are designed to greatly reduce, if not eliminate, movement to surface water. Therefore, actual impacts to aquatic invertebrates or birds and mammals that feed in aquatic habitats are anticipated to be minimal. Because of the targeted nature of the application to soil following drench or injection applications, only those insects that feed on treated host plant would be directly exposed. Most insects, such as flying insects, would receive no exposure following a soil application. This limited exposure during soil applications indicates that most insects and insectivorous species would experience minimal impact. Exposure and the potential for impacts to flying insects and insectivorous species would be greater following a foliar application.

This ERA will be used to assist CDFA in assessing potential to affect particular species and developing site-specific measures to protect these species.

2 Introduction

This Ecological Risk Assessment (ERA) is for nine alternative application scenarios within the California Department of Food and Agriculture's (CDFA) Pierce's Disease Control Program (PDCP) for the control of glassy-winged sharpshooters in nursery and urban/residential settings. This document is an addition to the Statewide Plant Pest Prevention and Management Program, Environmental Impact Report, Volume 2 - Appendix A, Ecological Risk Assessment, SCH # 2011062057 (Statewide PEIR) (CDFA, 2014a).

2.1 Purpose of the Ecological Risk Assessment

The ERA assesses potential future activities to be conducted under CDFA's Proposed Program. Specifically, the ERA focuses on chemical applications that would be available for use to control the glassy-winged sharpshooter. The ERA evaluates the potential risk to terrestrial and aquatic species following such chemical applications.

2.2 Approach

A detailed discussion of the approach for the ERA process is provided in the Statewide PEIR (CDFA, 2014a).

This ERA was conducted by using models and exposure data developed primarily by the USEPA in the context of typical application methods and settings in California. The ERA depends on these USEPA exposure models to estimate environmental concentrations and risk estimates in lieu of observed adverse effects. The majority of these models, described in detail in the applicable sections of the Statewide PEIR, are Microsoft Excel-based user interface packages that allow for input of information specific to the Proposed Program, as well as default data when site-specific data are not available. Since multiple models were required for this ERA and some models require the output of other models as input, it was convenient to integrate several models into one Excel workbook so that information from all models could be combined into a single risk estimate as the final output for each pesticide application scenario. This Excel workbook is referred to as the Comprehensive Risk ANalysis Kalculator (CRANK), providing a consolidated tool to estimate risk for the ERA (as well as the Human Health Risk Assessment).

To present information that serves as inputs for the various models used previously in the ERA in the Statewide PEIR (CDFA, 2014a) in an organized and efficient manner, a Microsoft Access database with a custom user interface was created. This Microsoft Access database is referred to as the **Dashboard Database**. Data used previously and also used as part of this analysis can be found in the **Dashboard Database**.

The database specifically contains the following information:

- Specific details of each chemical application scenario, including application rates, maximum number of applications per year, application intervals, method of application, application area, etc.
- Pesticide product formulations, including concentration of active ingredient and, to the extent information is available, inert ingredients and adjuvants

- Physical, chemical, and fate properties of the chemicals considered in the ERA, including half-life, degradation rate, vapor pressure, solubility, molecular weight, octanol-water coefficient (Log K_{OW}) and soil adsorption coefficient (Log K_{OC})
- Toxicological properties of the chemicals considered in the ERA, as well as toxicity reference values (TRVs)
- Summary of environmental effects based on published literature
- Model specific inputs and outputs
- Tissue concentrations based on dietary exposure model results
- Size of species home and foraging ranges
- Soil concentration estimation results
- Water concentration estimation results
- Individual risk quotients (RQs) for all surrogate species for each chemical ingredient
- Total RQs for all surrogate species for combined chemical ingredients used in an application scenario

3 Problem Formulation

Problem formulation is the first step in the ERA process. Its purpose is to establish the goals, breadth, and focus of the assessment through a systematic process to identify the major factors to be considered in the assessment. As discussed in the Statewide PEIR (CDFA, 2014a), CDFA and the risk assessment team involved staff from California Department of Pesticide Regulation (DPR) and Office of Environmental Health Hazard Assessment (OEHHA) during the problem formulation to facilitate the exchange of information to ensure this ERA meets both the public outreach and scientific goals desired by CDFA for the Proposed Program.

Problem Formulation integrates available information (sources, contaminants, effects, and environmental setting) and serves to provide focus to the ERA. Additional details regarding the Problem Formulation are available in the Statewide PEIR (CDFA, 2014a).

3.1 Application Scenarios

Details regarding the application of pesticide active and inert ingredient and adjuvants that impact the estimation of potential risk are:

- Type of chemical
- Concentration of chemical
- Application method (*e.g.*, soil injection, fumigation, spraying)
- Duration and frequency of applications
- Rate of application
- Area of application
- Setting in which activity would occur (*e.g.*, agriculture, residential)

The primary goal of the Pierce's Disease Control Program (PDCP) is to minimize the statewide impacts of Pierce's disease and its vectors in California. Pierce's disease is a deadly disease of grapevines, that is caused by the bacterium *Xylella fastidiosa*. The bacterium is spread by xylem-feeding insects, most notably the glassy-winged sharpshooter (GWSS). The GWSS is an invasive

insect pest which established and spread in southern California in the 1980s and 1990s. It caused serious outbreaks of Pierce's disease, leading to the establishment of the PDCP in 2000 to protect California's vineyards and other resources from further damage. The five major components of the PDCP are contain the spread, statewide survey and detection, rapid response, outreach, and research.

As part of the Statewide PEIR (CDFA, 2014a), 59 application scenarios were analyzed in the PDCP. The alternative application scenarios analyzed in this ERA were not substantially similar to any of the previously analyzed scenarios.

In the PEIR, four soil drench scenarios with Safari® 20 SG were analyzed for a nursery setting. In the PEIR, soil drench applications were routinely combined with foliar applications of different pesticides and analyzed as such. In this assessment, Safari 20 SG (a.i.-dinotefuran, inert-sodium dodecylbenzene sulfonate) with the adjuvant No Foam B (containing dodecylbenzene sulfonate, isopropyl alcohol, ethanolamine, POE nonylphenol, and sodium xylene sulfonate) was analyzed as foliar spray in a nursery setting on the loading dock (PDCP-64) or in the nursery production area (PDCP-65). Under the Proposed Program, Safari 20 SG with the adjuvant No Foam B could be applied on a loading dock or in the production areas as a foliar spray to nursery stock plants using a mechanically pressurized sprayer, backpack sprayer, hydraulic sprayer, or boom sprayer. Additionally, Safari 20 SG (without an adjuvant) may be applied to all nursery stock throughout the entire nursery using a mechanically pressurized sprayer, hydraulic sprayer (PDCP-66), or as an aerial application from aircraft (PDCP-66 Aerial).

Consistent with the PEIR, CDFA defined the product application rate and other application details for each of the specific scenarios in the Program Material Data Sheet (PMDS) found in **Appendix Eco-E** PMDS. The defined application rate in PDCP-64, a foliar application of Safari 20 SG to 3750 ft^2 on the loading dock, is 0.22 lb./Ac of dinotefuran. The defined application rate in PDCP-65, a foliar application of Safari 20 SG to 0.75 acres in the nursery production area, is 0.22 lb./Ac of dinotefuran. The defined application rate in PDCP-66, a foliar application of Safari 20 SG to the entire nursery (130 acres), is 0.22 lb./Ac of dinotefuran.

In the PEIR, one soil drench scenario with Merit® 2F (a.i.-imidacloprid, inert-glycerin) was analyzed for an urban/residential setting. In an addendum to the PEIR, Merit 2F was assessed for the eradication of Japanese beetles through application to turf or ornamental ground cover (CDFA, 2016a). Two new scenarios including application of Merit 2F in urban/residential settings were directly analyzed in this ERA. In this assessment, Merit 2F was analyzed in an urban/residential setting when applied as a foliar spray (PDCP-70) and soil drench (PDCP-71). A third scenario (PDCP-72), is not directly analyzed, but is discussed (see below).

Merit 2F could be applied under the Proposed Program as a foliar spray to host plants using a mechanically pressurized sprayer or a backpack sprayer. The soil drench applications of Merit 2F could be made to host plants using a mechanically pressurized sprayer. The defined application rate in PDCP-70, a foliar application of Merit 2F to 15 acres in an urban/residential setting, is 0.023 lb./Ac of imidacloprid. The defined application rate in PDCP-71, a soil drench application of Merit 2F to 15 acres in an urban/residential setting, is 0.4 lb./Ac of imidacloprid.

An additional scenario, PDCP-72, also entailed application of Merit 2F to 15 acres in urban/residential settings. Merit 2F could be applied in PDCP-72 at 0.4 lb./Ac of imidacloprid to the soil underneath host plants as a soil injection. PDCP-72 was considered substantially similar to the concurrently proposed scenario PDCP-71 (a soil drench application) because the two scenarios were identical in most aspects, including application site, application rate, applications per year, and retreatment intervals. The scenarios differed in that PDCP-72 is applied as a soil injection and PDCP-71 is applied as a soil drench application. Because exposure to all receptors in urban/residential settings is anticipated to be similar through soil injection as in soil drench application, PDCP-71 was considered equivalent to PDCP-72. In subsequent sections of this assessment, any exposures or risks discussed in reference to PDCP-71 also apply to PDCP-72.

For urban/residential application scenarios, the application area was defined as a 15-acre area representing the entire area within the prescribed 150-m distance from a GWSS find. Treatments will be applied to host plants only. Within an application area, many features would not be treated, such as pavement, buildings, and lawns. Following the approach used in PEIR Addenda 1 and 2, it was assumed approximately one-third of the entire area was treated.

Two soil drench scenarios with Marathon® II Greenhouse and Nursery Insecticide were analyzed for a nursery setting in the Statewide PEIR. In the PEIR, the soil drench application scenarios were routinely combined with foliar applications of different pesticides and analyzed as such. In this assessment, Marathon II Greenhouse and Nursery Insecticide (a.i.-imidacloprid, inert-glycerin) with the adjuvant No Foam B (containing dodecylbenzene sulfonate, isopropyl alcohol, ethanolamine, POE nonylphenol, and sodium xylene sulfonate) was analyzed as a foliar spray in a nursery setting on the loading dock (PDCP-77) or in the nursery production area (PDCP-78). Marathon II Greenhouse and Nursery Insecticide with the adjuvant No Foam B could be applied on a loading dock or in the production areas as a foliar spray to nursery stock plants using a mechanically pressurized sprayer, backpack sprayer, or hydraulic sprayer.

The defined application rate in PDCP-77, a foliar application of Marathon II Greenhouse and Nursery Insecticide to 3750 ft^2 on the loading dock, is 0.027 lb./Ac of imidacloprid. The defined application rate in PDCP-78, a foliar application of Marathon II Greenhouse and Nursery Insecticide to 0.75 acres in the nursery production area, is 0.027 lb./Ac of imidacloprid.

None of the scenarios described were considered substantially similar to the scenarios analyzed in the Statewide PEIR (CDFA, 2014a) or subsequent Addenda (CDFA 2016a; 2017a). Therefore, PDCP-64, PDCP-65, PDCP-66, PDCP-66 Aerial, PDCP-70, PDCP-71, PDCP-77, and PDCP-78 were directly analyzed in this ERA. In addition, PDCP-72 was indirectly addressed through analysis of PDCP-71.

3.2 Active and Inert Ingredients of Concern and Environmental Fate Properties

The risk assessment team investigated the labels and Safety and Data Sheets (SDS) to determine the list of active and inert ingredients. A single inert ingredient, sodium dodecylbenzene sulfonate (5%) was identified in Safari 20 SG. Safari 20 SG contains 20% dinotefuran. A single inert ingredient, glycerin (10%) was identified in Marathon II Greenhouse and Nursery Insecticide. Marathon II Greenhouse and Nursery Insecticide contains 21.4% imidacloprid. A single inert ingredient, glycerin (10%) was identified in Merit 2F. Merit 2F contains 21.4%

imidacloprid. No Foam B contains 1% sodium xylene sulfonate, 12.86% POE nonylphenol, 2.1% isopropyl alcohol, 5.44% ethanolamine, and 5.7% dodecylbenzene sulfonate. No other ingredients were named. With regards to ecotoxicity data, and chemical properties, sodium dodecylbenzene sulfonate and dodecylbenzene sulfonate are considered equivalent and the data for dodecylbenzene sulfonate are used for both chemicals. Note that inert ingredients are often considered confidential business information and are consequently not available to the public. The ingredients were researched for chemical characteristics, including toxicity, as well as their environmental fate properties. All environmental fate characteristics for the chemicals evaluated in this ERA can found in the relevant sections of the Dashboard Database associated with the Statewide PEIR.

3.3 Environmental and Ecological Settings

The application scenario evaluated as a foliar application (PDCP-70) of Merit 2F in an urban/residential setting includes applications to foliage of host plants. The application scenario evaluated as a soil drench application (PDCP-71) of Merit 2F in an urban/residential setting includes applications to soil beneath host plants. Applications to vegetables are not permitted under PDCP-71. The application scenario evaluated as a soil injection application (PDCP-72) of Merit 2F in an urban/residential setting is the same as for PDCP-71 and would result in similar exposures. Therefore, PDCP-72 was not directly analyzed in this ERA but considered substantially similar to PDCP-71. Urban/residential settings include: homes, parks, schools, sports fields, commercial settings, cemeteries, greenbelts, and road sides.

The application scenario evaluated as a foliar application of Safari 20 SG (PDCP-64) or Marathon II Greenhouse and Nursery Insecticide (PDCP-77) on a loading dock in this ERA include applications to containerized nursery stock only. Overspray to the loading dock surface could occur. The application scenario evaluated as a foliar application of Safari 20 SG (PDCP-65) or Marathon II Greenhouse and Nursery Insecticide (PDCP-78) to a nursery production area in this ERA include applications to containerized nursery stock only. Overspray to the surface of the nursery production area could occur. The application scenario evaluated as a foliar application of Safari 20 SG (PDCP-66, PDCP-66 Aerial) to the entire nursery production area in this ERA include applications to containerized nursery stock only, with overspray of the surface of the nursery production area likely. Assumptions regarding analysis of nursery scenarios are fully described in the ERA of the Statewide PEIR (CDFA, 2014a).

To determine the types of species that could be exposed as a result of these scenarios, the range of locations where the scenario could occur, and the ecological characteristics of those locations, were investigated. A more detailed discussion of the Environmental and Ecological Settings can be found in the Statewide PEIR (CDFA, 2014a).

3.4 Assessment Endpoints and Measures of Ecological Effect

An endpoint is the outcome of an effect on an ecological component, for instance, increased mortality of fish due to a pesticide application. An assessment endpoint is the specific statement of the environmental effect that is going to be protected, such as the prevention of fish mortality due to a pesticide application. Measurement endpoints are measurable attributes used to evaluate the risk hypotheses and are predictive of effects on the assessment endpoints (USEPA, 1998g).

Since a specific individual of a species may have different mortality susceptibility compared to other individuals of the same species, it is common to use a statistical representation to define what is meant by the assessment endpoint. For instance, it is common to assess mortality by using the lethal dose at which 50 percent of the population in a study failed to survive (LD_{50}).

Assessment endpoints are the ultimate focus in risk characterization and link the measurement endpoints with the risk decision making process. The ecological effects that the ERA intends to evaluate are determined by the assessment endpoint which is characterized by a specific measurement endpoint. The specific assessment and measurement endpoints that form the basis of this ERA are discussed in the following sections.

3.4.1 Assessment Endpoints

Three principal criteria are used to select ecological characteristics that may be appropriate for assessment endpoints: (1) ecological relevance, (2) susceptibility to known or potential stressors, and (3) relevance to management goals. Of these, ecological relevance and susceptibility are essential for selecting assessment endpoints that are scientifically defensible (USEPA, 1998). Although stressors can consist of many different environmental factors, the stressors addressed in this ERA are those effects related to pesticide active and inert ingredient and adjuvant exposure. This ERA's endpoints focus on organism-level outcomes. These include adverse effects such as mortality, reproductive effects, and pathological changes (*e.g.*, kidney or liver tissue damage) (USEPA, 2003c).

The acute assessment endpoints selected in this ERA for the Proposed Program include the prevention of mortality in:

1. Soil-dwelling invertebrates, non-target insects, aquatic invertebrates including benthic invertebrates, aquatic-phase amphibians, and fish;
2. Terrestrial-phase amphibians, reptiles, birds, and mammals that eat insects (*i.e.*, insectivores) or invertebrates (*i.e.*, invertivores);
3. Herbivorous reptiles, birds, and mammals;
4. Reptiles, birds, and mammals that eat fish (*i.e.*, piscivores);
5. Terrestrial-phase amphibians, reptiles, birds, and mammals that eat both plants and animals (*i.e.*, omnivores);
6. Bird and mammals that eat seeds (*i.e.*, granivores); and
7. Carnivorous amphibians, reptiles, birds, and mammals.

The chronic assessment endpoints selected for the ERA include the protection of survival and reproduction of the same species groups.

Typically, reproduction is a more sensitive endpoint than survival. Thus, this endpoint has been used over survival when it is available to result in a more conservative analysis. Adverse reproductive effects generally do not materialize until chronic exposures have occurred.

3.4.2 Measurement Endpoints

In terms of measurement endpoints, measures of exposure have been used to evaluate levels at which exposure may occur whereas measures of effect have been used to evaluate the response of the assessment endpoints if exposed to stressors. Concentration of a pesticide active or inert ingredient or adjuvant in water is a measure of exposure for an aquatic species, and daily intake of a pesticide active or inert ingredient or adjuvant in dietary items is a measure of exposure for terrestrial species. The concentration in water or the amount of daily ingestion of pesticide active or inert ingredient or adjuvant that causes adverse effects are measures of effects. The quantitative analysis assumed that a given species was present and did not address the likelihood that the species may actually occur in proximity to a specific pesticide or adjuvant application. The likelihood of presence at the application site is addressed qualitatively in the risk characterization.

In this ERA, toxicity is reported as TRVs, which are numerical representations of the measurement effects that are used in the risk assessment. A TRV is a toxicological index that, when compared with exposure, is used to quantify risk to an ecological receptor. The way in which TRVs are developed depends on available data on a pesticide active or inert ingredient or adjuvant's toxicological effects and commonly accepted assumptions that address uncertainty regarding the available data. TRVs are developed according to a highly structured and rigorous approach. This process often includes adjustments to observed laboratory values to account for uncertainty and application of safety factors to ensure that results of the risk assessment are conservative and ensure protection against adverse effects. TRVs are used to represent measurement endpoints of the environmental concentrations or daily doses (mg/kg bw-day) with uncertainty factors incorporated, such that exposure at levels above the TRV are likely to cause adverse effects for a species. If the estimated environmental concentration (EEC) or the estimated daily dose (EDD) of a pesticide active or inert ingredient or adjuvant exceeds the TRV, concern is triggered regarding the potential for an adverse effect to an organism.

Specific measurement endpoints used to develop the TRVs include no observable adverse effect levels (NOAELs), lowest observable adverse effects levels (LOAELs), and the median lethal (or effective) dose or concentration (*e.g.*, LD_{50}, ED_{50}, LC_{50}, or EC_{50}).

The methods for developing TRVs for the pesticide active or inert ingredient or adjuvants and species evaluated in this ERA are described in Section 5 of the ERA in the Statewide PEIR (CDFA, 2014a). These TRVs were the measurement endpoint for that active/inert ingredient-species combination. For many amphibians and reptiles, toxicity data from other taxonomic groups were used for TRV development. For the aquatic-phase for amphibians, fish, such as the rainbow trout, were often used to derive an appropriate TRV. For reptiles and terrestrial-phase amphibians, bird toxicity values act in place of specific toxicity values for reptile or terrestrial amphibian species (USEPA, 2004j).

3.5 Surrogate Species Selection

A large number of species occur in California. This ERA does not assess risk for every species, as such an assessment would be infeasible. The selection criteria and process by which surrogate species were selected, along with a complete list of species and their life history traits, can be

found in the Statewide PEIR (CDFA, 2014a) as well as the relevant sections of the associated Dashboard Database.

3.6 Conceptual Site Models

Development of conceptual site models (CSMs) is a fundamental part of the risk assessment process, and their inclusion in the ERA is intended to allow the reader to understand the exposure pathways that were evaluated for the application scenario. The CSM is a written and visual representation of predicted relationships among stressors (*e.g.* a pesticide application), exposure pathways (*e.g.* eating vegetation contaminated with the pesticide), and assessment endpoints (*e.g.* mortality). It outlines the potential routes of exposure for each assessment endpoint and includes a description of the complete exposure pathways. An exposure pathway demonstrates how a pesticide active or inert ingredient or adjuvant would be expected to travel from a source (application of pesticide active or inert ingredient or adjuvant) to a plant or animal that can be affected by that pesticide active or inert ingredient or adjuvant. An exposure pathway that is not complete means that it is unlikely for that organism to be exposed to the pesticide active or inert ingredient or adjuvant by that exposure route. Application-specific CSMs are presented below.

The ecological CSM covers the multiple pathways through which ecological receptors could be exposed to active and inert ingredients that may be applied under the Proposed Program. The starting point of each CSM is the application technique, which determines the characteristics of release of the pesticide active or inert ingredient or adjuvant into the environment. The possible pesticide application techniques addressed in this ERA for PDCP-64, PDCP-65, PDCP-66, PDCP-77, and PDCP-78 are foliar spray applications in nurseries; PDCP-70 is a foliar spray in an urban/residential setting; and PDCP-71 and PDCP-72 are soil drench or injections in urban/residential settings.

Additional details regarding the development and interpretation of CSMs can be found in Section 2.6 of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a).

3.6.1 Pierce's Disease Control Program

Figure Eco-1 provides details for foliar applications that can occur in nursery settings (PDCP-64, PDCP-65, PDCP-66, PDCP-77, and PDCP-78). Complete exposure pathways exist for inhalation or dermal contact with vapors, droplets, or mist. The only ecological receptor for which adequate dermal exposure and toxicity data exists was terrestrial insects via dermal contact exposure. Exposure pathways for terrestrial vertebrates were complete for inhalation, dermal contact, and ingestion of surface water, vegetation, and soil. Adequate exposure and toxicity data existed only for the ingestion pathway, so the inhalation and dermal pathways, although potentially complete, were not considered. The exposure to terrestrial insects was complete via ingestion of treated foliage and pollen or nectar, and toxicity data were available for these receptors. Therefore, this exposure pathway was analyzed. The exposure pathway for fish and aquatic invertebrates, including benthic invertebrates, was complete via surface water and sediment following deposition from drift or from movement through or over soil beneath treated plants. However, adequate toxicity data for ingestion of contaminated food items or ingestion of

water by aquatic species was unavailable, so only effects from exposure via immersion in pesticide-containing surface water and sediments were analyzed.

Figure Eco-2 provides details for foliar or soil drench or injection applications that can occur in urban/residential settings (PDCP-70, PDCP-71, and PDCP-72). Complete exposure pathways exist for inhalation or dermal contact with vapors, droplets, or mist following foliar applications. Incomplete exposure pathways exist for inhalation for ecological receptors following soil drench or injection application since applications are made with a large droplet nozzle one to two feet above the ground, greatly reducing the amount of drift or using a soil probe into the soil. The exposure pathway for terrestrial insects is complete via ingestion of foliage and pollen or nectar following uptake from treated soil or from deposition following foliar sprays, and toxicity data were available. Therefore, this pathway was analyzed. Exposure pathways for terrestrial vertebrates were complete for dermal contact and ingestion of surface water, vegetation, and soil. However, adequate exposure and toxicity data exist only for the ingestion pathway for terrestrial vertebrates, so the dermal and inhalation pathways, although potentially complete, were not quantitatively evaluated. The exposure pathway for fish and aquatic invertebrates, including benthic invertebrates, is complete via surface water and sediments with pesticide deposits from transport on/through soil beneath treated plants and from the possibility of drift when foliar applications are made adjacent to surface waters. However, toxicity data for ingestion of contaminated food items or ingestion of water or sediment by aquatic species was unavailable preventing quantitative assessment, so only immersion in surface waters containing pesticide residues was quantitatively analyzed.

3.7 Analysis Plan

This ERA uses both reported values in the scientific literature and widely used models specific to ecological risk assessment to estimate the exposures outlined by the CSM. In addition, effects data for the measurement endpoints uses data available from the scientific literature. Since the applications adhering to scenarios analyzed in this ERA could occur in various locations in California, many of which would be unlikely to occur on a routine basis, it was not considered practical to collect and utilize field or site-specific data.

The analysis plan with the CSMs has been implemented in the next phase of the ecological risk assessment process: analysis. The analysis phase is subdivided into two sections: exposure assessment and effects assessment.

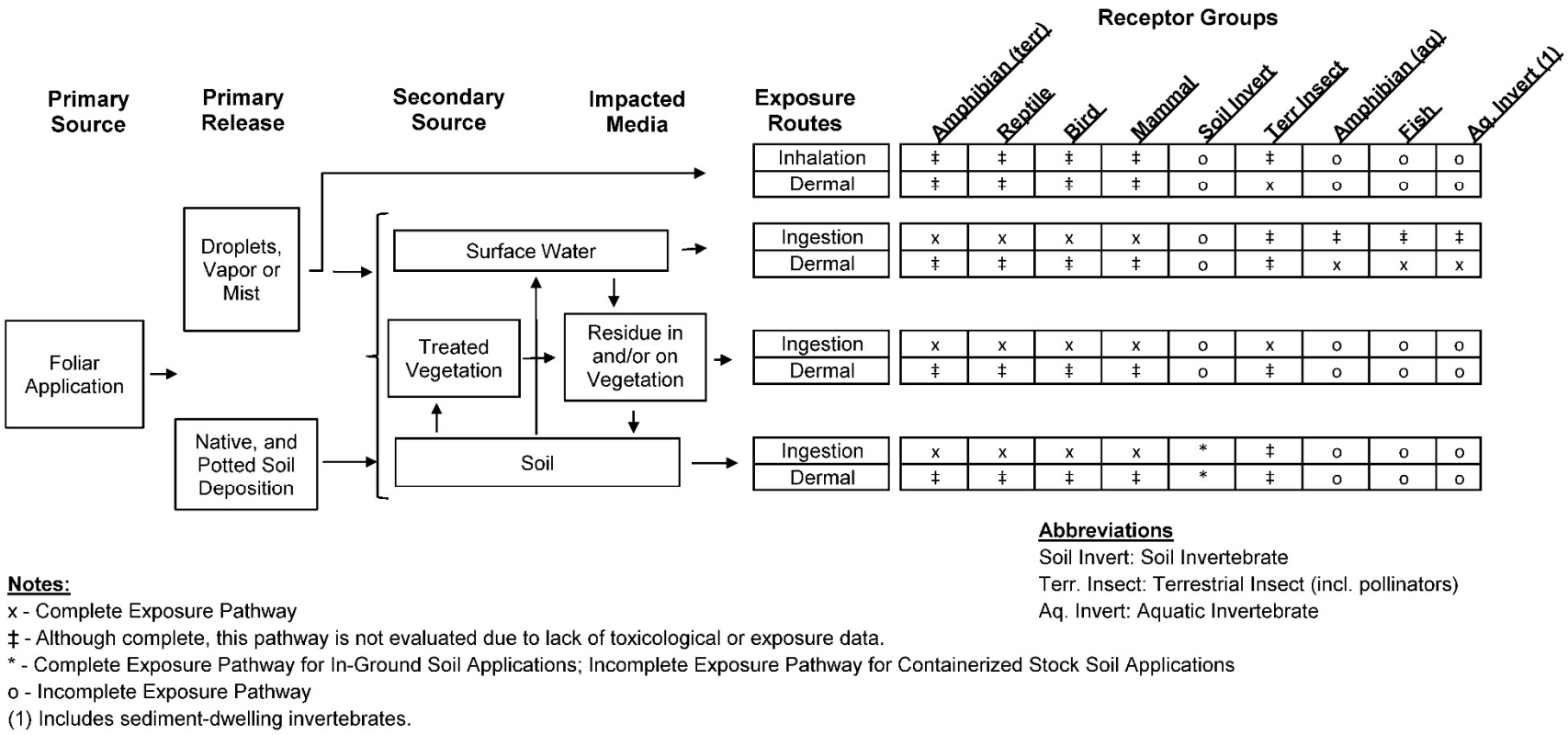

Figure Eco-1. Pierce's Disease Control Program Foliar Nursery Conceptual Site Model

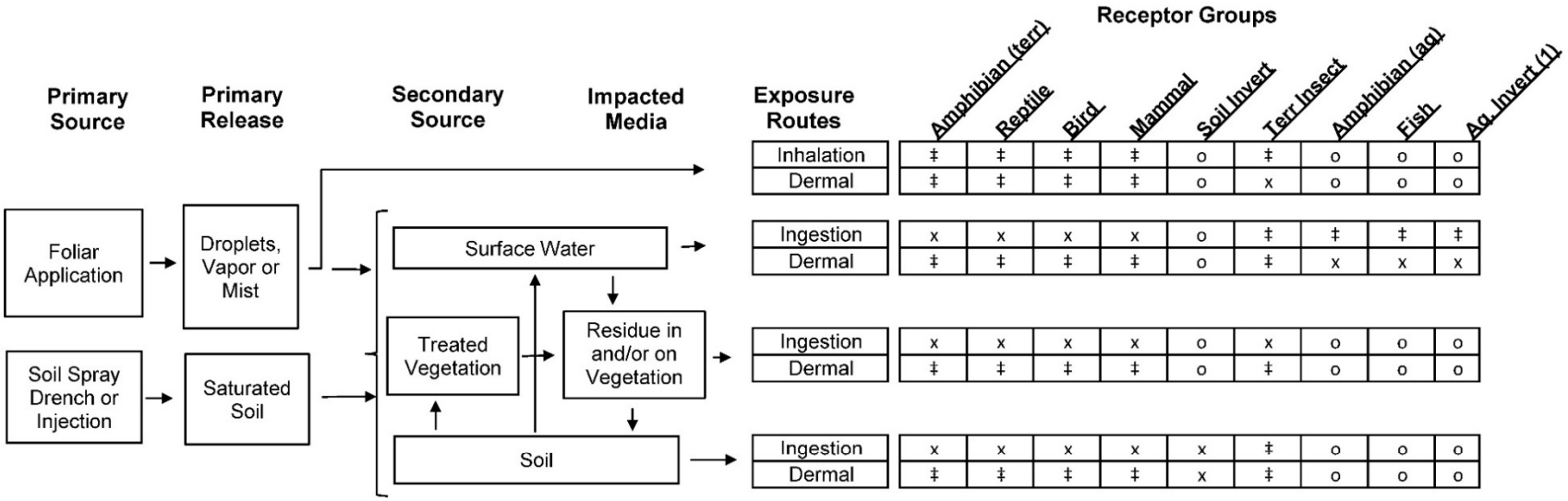

Figure Eco-2. Pierce's Disease Control Program Foliar and Soil Drench or Injection Urban/Residential Conceptual Site Model

4 Exposure Assessment

The exposure assessment is part of the analysis phase of the risk assessment process that follows the problem formulation phase described in Section 2. The exposure assessment provides a description and quantification of the nature and magnitude of the interaction between pesticide active or inert ingredient or adjuvants in surface water, sediment, soil, or diet and the ecological receptors. This quantitative accounting of the amount of exposure is known as the EEC and is the main outcome of the exposure assessment. The EEC is defined as the predicted concentration of a pesticide active or inert ingredient or adjuvant within an environmental compartment (*i.e.* within soil, water, plant tissue, or a specific organism) based on estimates of quantities released, discharge patterns and inherent disposition of the substance (*i.e.* fate and distribution), as well as the nature of the specific receiving ecosystems. The results of the exposure assessment (*i.e.* the EECs) are combined with the effects assessment to derive the risk characterization results in the final phase of the risk assessment process.

The exposure assessments are broken down between acute (short term) and chronic (long term) exposures, described in detail below. Several exposure models and assumptions are required to estimate the amount of pesticide active or inert ingredient or adjuvants that an organism is exposed to as the pesticide active or inert ingredient or adjuvant gets transported along the various exposure pathways. The exposure models and assumptions for acute and chronic exposures, for each receptor group in general, in aquatic and terrestrial environments, and under each application scenario were described in the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a). Only those pathways or models new or unique to this assessment are included below.

Since it is not possible for this ERA to evaluate exact concentrations and exposures in the field, EECs are estimated using various conservative models that have been developed for use in risk assessments. These models are designed to use conservative assumptions and in many cases are not capable of modeling all of the complex fate and transport processes that can occur once the pesticide active or inert ingredient or adjuvants are released into the environment. Typical fate properties that tend to decrease the concentration of a pesticide active or inert ingredient or adjuvant include aerobic degradation, anaerobic degradation, photolysis, hydrolysis, absorption, solubilization, and volatilization. Key transport properties that may not be accounted for are dilution and partial transfer between media such as plants, soil, water, and air. Therefore, most of the EECs will represent an upper-bound value since not all fate and transport properties have been modeled.

4.1 Acute and Chronic Exposure

Please refer to the Statewide PEIR for an explanation of how acute and chronic exposures were determined (CDFA, 2014a).

4.2 Assumptions for Exposure Following Foliar or Soil Drench Applications

Please refer to the Statewide PEIR for an explanation of how EECs were estimated following foliar applications (CDFA, 2014a). The exposure estimates for most environmental concentration procedures and models remained the same as were described in Section 3.2 of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a). A brief discussion is presented here. For full details, please see the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a). Estimation methods for uptake of residues from soil into plants were updated. Concentrations in surface water were estimated using the USEPA's Pesticide in Water Calculator (PWC) rather than the outdated PE5 model.

4.2.1 Concentration in/on Vegetation

4.2.1.1 Concentration in/on Terrestrial Vegetation

Uptake by plants from soil was estimated in a similar manner as in the Ecological Risk Assessment of the PEIR (CDFA, 2014a). Plant surface residues following a foliar application were estimated using USEPA's T-REX model. For plant uptake from soil, a revised Briggs' Equation was used to estimate a Terrestrial Vegetation Uptake Factor (VUF) based on the updated version in USEPA (2014a).

$$\text{Terrestrial VUF (dry weight)} = ([10^{(0.95 \times \text{Log } K_{ow} - 2.05)} + 0.82] \times \text{TSCF} \times \left[\frac{\rho}{\theta + \rho \times K_{oc} \times f_{oc}}\right])$$

$$\text{TSCF} = [-0.0648 \times (\text{Log } K_{ow})^2 + 0.241 \times \text{Log } K_{ow} + 0.5822]$$

Where:
TSCF = Transpiration Stream Concentration Factor
K_{ow} = Octanol/Water Partition Coefficient (unitless)
ρ = soil bulk density (g-dw/cm^3)
θ = soil-water content by volume (cm^3/cm^3)
K_{oc} = soil organic carbon-water partitioning coefficient (cm^3/g-organic carbon or L/kg-organic carbon)
f_{oc} = fraction of organic carbon in the soil

Once the terrestrial VUF was estimated, it was multiplied by the concentration of pesticide active and inert ingredients and adjuvants in soil to get the EEC in terrestrial vegetation due to uptake from soil.

$$\text{EEC} = \text{VUF} \times \text{Soil Concentration}$$

Complete details regarding how the Briggs' equation was used appear in the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a). In keeping with the guidance in USEPA (2014a), if the Log K_{ow} was greater than 5.0, no uptake was assumed. When the Log K_{ow} is negative, the TSCF is assumed to be 1.0 (Collins *et al.,* 2006). The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

4.2.1.2 Concentration in Aquatic Vegetation

The Briggs' equation was used to estimate concentrations in aquatic vegetation in a similar manner as was performed in the Statewide PEIR (CDFA, 2014a). The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

4.2.2 Surface Water Concentrations from Soil Run-off and Aerial Drift

The concentration of pesticide active or inert ingredient or adjuvant in surface water resulting from drift, runoff, or erosion during and after pesticide applications was estimated using the PWC, the successor to the Surface Water Concentration Calculator (SWCC) (USEPA, 2017c). The PWC, incorporates two distinct, but connected models to simulate transport from soil to water: the Pesticide Root Zone Model version 5.0+ (PRZM5) and the Variable Volume Water Body Model (VVWM). PRZM is a one-dimensional, dynamic, compartmental model that can be used to simulate pesticide movement in unsaturated soil systems within and immediately below the plant root zone. VVWM contains a set of process modules that link fundamental chemical properties to the limnological parameters that estimate the kinetics of fate and transport in aquatic systems. The PWC estimates pesticide concentrations in the water as the upper 90th ranked annual peak, 4-day average, 21-day average, 60-day average, and 365-day average of the simulation as well as the mean value of all daily concentrations in the simulation. The PWC also estimates the upper 90th ranked annual and 21-day average sediment pore water peak concentrations as well as the annual and 21-day concentration in sediment.

The standard PRZM/VVWM runoff modeling scenario is based on site-specific conditions of fields draining into water bodies for drinking water and aquatic exposure assessments. Each PRZM simulation represents a unique combination of climatic conditions, crop-specific management practices, soil-specific properties, site-specific hydrology, and pesticide-specific application and dissipation processes. Daily edge-of-field loadings of pesticides dissolved in runoff waters and adsorbed to entrained sediment, as predicted by PRZM, are discharged into a standard water body, and simulated by VVWM. VVWM accounts for volatilization, sorption, hydrolysis, biodegradation, and photolysis of the pesticide (USEPA, 2014c).

The PRZM5 standard scenario used, referred to in the model documentation as the "farm pond scenario," is a 10-hectare (24.7-acre) agricultural field, releasing pesticide-containing runoff into a one-hectare (2.47-acre) body of water, 2 meters (6.56 feet) deep equaling 20,000 cubic meters (706,293 cubic feet). This scenario was used for pesticide exposure assessments because it focuses on exposure to ecological receptors (Wild and Jones, 1992). Limnetic or water column concentrations in a waterbody were used for drinking water for wildlife as well as exposure for fish and other aquatic species. Sediment and sediment pore-water concentrations were used for exposure to benthic invertebrates. The water volume in the water body was assumed to remain constant and no outflow was modeled.

It is possible that pesticide active or inert ingredient or adjuvant applications under the Proposed Program could be made in proximity to flowing water such as rivers or streams or other water bodies with inflow and outflow. These waterbodies will experience dilution of water concentrations due simply to introduction of fresh water. Additionally, large streams or lakes or ponds larger than the modeled waterbody will not achieve the modeled concentrations due to the

dilution in a larger volume of water. Similarly, marine/estuarine environments will not achieve the modeled concentrations due to larger volumes of water and flushing due to tidal and wave action.

To simulate application efficiency and spray drift loadings to waterbodies resulting from spray drench applications, an Application Efficiency (fraction) value of 1 and Spray Drift (fraction) value of 0 have been selected to simulate all of the pesticide reaching the target site (i.e., soil surface with no application inefficiencies or spray drift loadings to waterbodies). To simulate application efficiency and spray drift loadings to waterbodies resulting from foliar and aerial applications, AgDRIFT Version 2.1.1 (USEPA, 2017d) was used. For foliar applications, the Tier I Ground (Agricultural) mode was used and Boom Height (Low Boom) and Droplet Size Distribution (ASAE Fine to Medium/Coarse) were selected. For aerial applications, the Tier III Aerial (Agricultural) mode was used with all default options selected. Spray drift fraction was determined for both foliar and aerial assessments by choosing the Aquatic Assessment option and defining the Distance to Water Body from Edge of Application as 0 feet. Because AgDRIFT does not estimate application efficiency for aerial applications, the default value from EXPRESS (EXAMS-PRZM Exposure Simulation Shell), a precursor water model to the PWC with additional USEPA approved default parameters, has been used for aerial application efficiency. Based on the previous selections, the estimated application efficiency and spray drift percentages used were 99.6% and 0.9%, respectively, for foliar applications and 95% and 5.3%, respectively, for aerial applications.

PRZM Scenario Files have been selected based on similarities between application location and setting and the environment modeled by the scenario file. Specific PRZM Scenario Files are included with the downloadable software package for PWC (USEPA, 2017c). The CAnurserySTD_V2 scenario represents outdoor ornamental nursery scenarios in southern California and was selected to simulate nursery applications. Topographical conditions as well as cultivation practices and plant types vary greatly among nurseries. To be protective of the many diverse nursery conditions that exist, the CAnurserySTD_V2 scenario was developed to represent conservative nursery practices that will yield "high-end" runoff. The scenario was parameterized primarily using data from outdoor ornamental nurseries in San Diego, CA since it is the county with the greatest number of acres in production within the region. According to the *Southern California Outdoor Ornamental Nursery Scenario* description file provided with the PWC, "Nursery soils in southern California are commonly sandy loams (Jim Bethke, personal communication [sic]). Exact locations and geographic extent of nurseries in the region are not available; therefore, soils were selected based on soil recommendations of local experts, the geographic extent of nursery supporting soils in the area, the drainage group, slope, and erodibility. The Cieneba series was selected for this scenario since it is a sandy loam, is of large extent in the region, and is a hydrologic group C soil." (USEPA, 2017c). Since not all nursery loading docks would necessarily be paved, loading docks were assumed to be permeable surfaces such as gravel. The slope used for previous nursery application scenarios in the Statewide PEIR (CDFA, 2014a) was 5%. However, consistent with typically observed nursery settings, both the loading docks and surrounding areas are generally flat. Therefore, a slope of 2% was selected for nurseries to reflect these conditions. Note that the model results are largely insensitive to slope and both 2% and 5% slopes yield statistically similar water quality results.

For urban/residential applications, where fruit trees are treated, CAfruit_WirrigSTD was selected. Note that, although previous analyses in the Statewide PEIR (CDFA, 2016a; 2017a) have incorporated analysis of impervious surfaces using PRZM impervious surface scenarios, such an approach would not be appropriate for this analysis. Unlike previous analyses, which evaluated applications to turf and groundcover next to pavement, the scenarios included in this assessment evaluate applications to fruit trees that are not typically adjacent to pavement or other impervious surfaces. Thus, the surface water contribution from applications or spray drift to or near impervious surfaces is considered negligible. All PRZM scenario parameters were left at their default values, except for land slope. Consistent with slopes and soil types found in the National Resource Conservation Service Soil Survey in urban settings, a land slope of 2% was selected (Soil Survey Staff, 2016).

In determining watershed and water body dimensions, the USEPA farm pond defaults were used with two exceptions. Field area was defined for each scenario based on the treatment areas detailed in the PMDS (see **Appendix Eco-E**). For urban/residential applications within urban landscapes, roughly a third of the designated treatment area listed in the PMDS actually occupy potential treatment locations (e.g., host plants along with the areas that could be oversprayed). Thus, the field area modeled for urban/residential applications was 1/3 the field area listed in the PMDS. The hydraulic length was calculated as the square root of the selected field area to provide the depth of a field assumed to be a square.

The PWC determines a Henry's Law Constant based on the molecular weight, vapor pressure, and water solubility. Since the soil organic carbon/water partition coefficient (K_{oc}) better predicts the mobility of organic contaminants in soil, K_{oc} values have been used in preference to the soil/water partition coefficient (K_d). Water bodies modeled through PWC are fixed at pH 7 (pers. comm. D.F. Young, USEPA), therefore neutral hydrolysis half-lives (pH 7) are used as inputs. A reference temperature of 25°C were selected for each degradation pathway and a value of 40°N was selected for the photolysis reference latitude. Consistent with the directions contained in the PWC model itself, Heat of Henry was estimated via EPI Suite (USEPA, 2011f). The air diffusion coefficient was left as the default 0 to increase the amount of pesticide that stays within environmental media. Ingredient-specific physical and chemical properties are presented in Appendix C of the Human Health Risk Assessment.

Pesticide active or inert ingredient or adjuvants were assumed to be retained on foliage (Left as Foliage), which allows for both foliar degradation and wash off during rain events and subsequent transport to waterbody via runoff and erosion.

The PWC limits the number of applications to 50 applications per year. Through collaboration with Yuzhou Luo, environmental and research scientist at DPR, and Dirk F. Young, senior scientist at the USEPA and developer of the PWC, this limitation was overcome through expanding the PRZM input files generated by the PWC for 50 applications out to 150 applications and feeding those input files manually into the VVWM to generate results (pers. comm. Yuzhou Luo, DPR; pers. comm. D.F. Young, USEPA).

The PWC uses weather files containing weather data from 1961 through 1990. The Sacramento meteorological file (W23232.dvf) was selected for urban/residential scenarios, while the San

Diego meteorological file (W23188.dvf) was selected for nursery scenarios. The starting application dates selected for urban/residential and nursery applications were March 1st and January 1st, respectively. All other application details are defined in the PMDS (**Appendix Eco-E**). The EECs estimated and used in this assessment appear in **Appendix Eco-A.**

4.2.3 Soil Concentrations

As described in Section 3.5 of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a), 100% of the applied pesticide was assumed to occur in soils following a soil drench application. Drift to soil following a foliar application is assumed to be 20%, consistent with the PEIR (CDFA, 2014a). The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

4.2.4 Concentrations in Insects

The USEPA T-REX model and the Briggs' equation were used to estimate concentrations in insect prey items in a similar manner as was performed in the Statewide PEIR (CDFA, 2014a). The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

4.2.5 Tissue Concentrations in Aquatic Organisms

As described Section 3.3.2 of Appendix A, the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a), tissue concentrations in aquatic organisms were estimated using the USEPA's KABAM model (K_{ow} (based) Aquatic BioAccumulation Model) (USEPA, 2009s). The EECs estimated and used in this assessment appear in **Appendix Eco-B.**

4.2.6 Honey Bee and Non-target Insect Exposure

The USEPA recently released guidance for assessing risk to honey bees (USEPA, 2014a) that includes additional guidance on estimating acute and chronic exposure of larval and adult bees or non-target insects to pollen and nectar. The methods in the guidance document are otherwise essentially the same as those presented in the Statewide PEIR (CDFA, 2014a) based on the previous methods (USEPA, 2012g).

4.3 Oral Ingestion Exposure Calculations

No changes were made to how dietary exposures were estimated. Please see Section 3.4 of the Ecological Risk Assessment of the Statewide PEIR (CDFA, 2014a) for a full description of how oral ingestion exposure was estimated.

4.3.1 Area Use Factor

To acknowledge that some species' food could be acquired from outside the area receiving pesticide treatments, an Area Use Factor (AUF) was calculated for each species and each pesticide application scenario based on the species' foraging range and typical treatment areas. The treatment areas for the different scenarios have been described. In addition to the size of the

treated area, the size of the species home range or foraging range was used to calculate the AUF as follows:

$$\text{AUF} = \frac{\text{Foraging Range}}{\text{Treated Area}}$$

For species with a home range or foraging area smaller than the size of the treated plot, all their food was assumed to be gathered from a treated plot. For species with a home range larger than the size of the treated plot, the proportion of diet containing pesticide residues could be assumed to be comparable to the AUF.

In the assessment of acute risk, the AUF was always set to 1.0. An animal could potentially spend a short time within a treated area and become acutely exposed shortly after an application. Therefore, no reduction in the exposure estimate has been made based on the AUF. In the chronic assessment for terrestrial species, three exposure estimates were made. One exposure estimate used the calculated AUF based on the species' foraging or home range and the application area. A second estimate set the AUF to 1.0 to assess the potential situation where adjacent applications might have been made to the entire home range. The third estimate used the mid-point between the estimated AUF and 1.0. For example, if the estimated AUF would have been 0.45, the mid-point AUF would be 0.725. In the chronic assessment of aquatic species, the AUF was always 1.0. By presenting a range of exposures estimated from different AUF (*i.e.*, no AUF, Mid-Point AUF, and AUF), other species represented by the surrogate species that have similar diets, but a differing foraging range, were better included in the exposure estimates.

Given the large geographic scope of the Proposed Program, it was not possible to predict the number of treatment plots that might occur within a species home range. Assuming an AUF equal to 1.0 would likely be overly conservative but using the AUF based on the species' home range might not be conservative enough. Inclusion of the mid-point AUF was an attempt to capture this uncertainty. Therefore, both ends of this spectrum, as well as the mid-point, were developed and the full range of possibilities presented.

5 Effects Assessment

The effects assessment consists of an evaluation of available toxicity or other adverse effects information that can be used to relate the exposures to pesticides and inert ingredients and adverse effects in ecological receptors. Toxicity is a property of a chemical, and the toxicity of a chemical alone does not indicate its potential to harm a given organism. A key to understanding the effects of a chemical on an organism is the dosage of the chemical that the organism receives or the concentration to which it is exposed. For example, certain substances are considered toxic (*e.g.*, caffeine), but are harmless in small dosages. Conversely, an ordinarily harmless substance (*e.g.*, water) can be lethal if over-consumed. This relationship between exposure and effect on an organism is called a dose-response effect and is discussed in Section 5: Risk Characterization. Data that can be used to define the toxicity of a chemical include literature-derived or site-specific single-chemical toxicity data, site-specific ambient-media toxicity tests, and site-specific field surveys (Suter, 2007). For this ERA, data were restricted to single-chemical toxicity data

from literature sources because specific toxicity data for the mixtures of pesticide active or inert ingredient or adjuvant were not available.

In this ERA, numerical representation of the measurement effects for toxicity are reported as TRVs. TRVs are a toxicological index that, when compared with exposure, are used to quantify risk to ecological receptors. The way in which TRVs are developed depends on available data of the chemical's toxicological effects and commonly accepted assumptions that address uncertainty regarding the available data. TRVs were developed using the same methods as described in the Statewide PEIR (CDFA, 2014a). TRVs for sodium dodecylbenzene sulfonate, ethanolamine, isopropyl alcohol, POE nonylphenol, glycerin, dinotefuran, and imidacloprid can be found in **Appendix Eco-C**. No relevant ecotoxicological data were available on which to base TRVs for sodium xylene sulfonate, so no TRVs are included in **Appendix Eco-C** for that inert ingredient.

The USEPA has developed acute toxicity categories for pesticides ranging from the most toxic category of 'very highly toxic' to the least toxic category of 'practically nontoxic' (**Table Eco-1**). These are strictly based on the results of laboratory acute toxicity tests and do not reflect the exposure or dose received by an organism that determines if there is an adverse effect following a pesticide application. This classification only gives a description of the numerical toxicity property of the chemical. It is not until it is combined with an EEC or EDD that adverse effects may occur. The detailed description of the toxicity classification from **Table Eco-1** for the various active and inert ingredients is provided for each application scenario below.

Table Eco-1. Acute Ecotoxicity Categories for Terrestrial and Aquatic Organisms.

Toxicity Category	Avian: Acute Oral LD_{50} (mg/kg)	Aquatic Organisms: Acute LC_{50} (ppm)	Wild Mammals: Acute Oral LD_{50} (mg/kg)	Non-Target Insects: Acute LD_{50} (µg/bee)
very highly toxic	<10	<0.1	<10	
highly toxic	10-50	0.1 - 1	10 - 50	<2
moderately toxic	51-500	>1 - 10	51 - 500	2 - 11
slightly toxic	501-2000	>10 - 100	501 - 2000	
practically nontoxic	>2000	>100	>2000	>11

Source: USEPA 2017f

5.1.1 Dinotefuran

The active ingredient in Safari 20 SG is dinotefuran. No suitable toxicity information was available for aquatic-phase amphibians, so the toxicity of dinotefuran to aquatic-phase amphibians was assumed to be similar to that in fish. Dinotefuran is highly toxic to moderately toxic to freshwater aquatic invertebrates and practically nontoxic to estuarine/marine aquatic invertebrate species. Dinotefuran is slightly toxic to freshwater fish and practically nontoxic to estuarine/marine fish species.

No toxicity information was available for terrestrial-phase amphibians or reptiles. The toxicity of dinotefuran to terrestrial-phase amphibians was considered similar to that in birds. Neonicotinoids such as dinotefuran are expected to have toxicity to reptiles similar to that in mammals (Mehlhom *et al.* 2005). Toxicity for inert ingredients and adjuvants in reptiles is still

considered similar to that in birds (USEPA, 2004j). Dinotefuran is slightly toxic to birds, but moderately toxic to mammals. Dinotefuran is highly toxic to bees.

5.1.2 Imidacloprid

The active ingredient in Merit 2F is imidacloprid. Imidacloprid is slightly toxic to aquatic-phase amphibians. Imidacloprid is slightly toxic to freshwater and estuarine/marine aquatic invertebrate species. Imidacloprid is moderately to slightly toxic to freshwater fish and estuarine/marine fish species.

No toxicity information was available for terrestrial-phase amphibians or reptiles. The toxicity of imidacloprid to terrestrial-phase amphibians was considered similar to that in birds. Neonicotinoids such as imidacloprid are expected to have toxicity to reptiles similar to that in mammals (Mehlhom *et al.* 2005). Toxicity for inert ingredients and adjuvants in reptiles is still considered similar to that in birds (USEPA, 2004j). Imidacloprid is highly to moderately toxic to birds and moderately toxic to mammals. Imidacloprid is highly toxic to bees.

6 Risk Characterization

Risk characterization is the final phase in the risk assessment process. The purpose of the risk characterization phase is to integrate the two pieces from the analysis phase: exposure and effects assessment. In the risk characterization, exposure and effects data are integrated to allow the risk assessor to draw conclusions concerning the presence, nature, and magnitude of effects that may exist under the application scenarios. This includes both quantitative and qualitative assessments to properly characterize the complete risk assessment outcome. The quantitative assessment is based on a comparison of the numerical value from combining exposure and effects – the RQ – against a target value – the Level of Concern (LOC). For scenarios that have RQs below the LOC, a risk assessor can conclude that there is a low potential for adverse effects from implementation of the scenario. This conclusion is due to the conservative assumptions that were consistently used throughout the risk assessment process. For situations where the RQ exceeds the LOC, a risk assessor conducts a qualitative analysis of the potential for adverse effects under the application scenario that incorporates information that cannot be included in the quantitative analysis. The exceedance of an RQ alone is not sufficient to indicate a presumption that adverse effects are likely.

In ecological risk assessments for pesticides, EECs or EDDs determined in the exposure assessment (Section 3) are compared to TRVs developed in the effects assessment (Section 4) to calculate an RQ (USEPA, 2004j).

$$RQ = \frac{\text{EEC or EDD}}{\text{TRV}}$$

Where:
RQ = Risk Quotient (unitless)
EEC = Estimated Environmental Concentration (mg dw/kg or µg/L)
EDD = Estimated Daily Dose (mg/kg bw-day)
TRV = Toxicity Reference Value (mg/kg bw-day or µg/L)

When the RQ is equal to or exceeds an LOC of 1.0, a potential risk has been presumed to exist for the non-threatened or non-endangered ecological receptor being assessed. For listed threatened or endangered species, the LOC is reduced to 0.5, to represent the heightened concern for these species; this LOC is referred to as the Threatened and Endangered (T&E) LOC. It is important to remember that whenever an RQ exceeds the standard LOC, suggesting exposures to non-T&E species might be harmful, the lower T&E LOC providing additional protection to special-status species is necessarily exceeded.

RQs for both acute and chronic risk have been calculated in the same manner using the appropriate acute or chronic EEC or EDD paired with appropriate acute or chronic TRV. When all pesticide active and inert ingredients and adjuvants were assessed, the RQs for all chemicals present were assumed to be additive and thus totaled together to determine the Total RQ. The total RQ is then compared to the applicable LOC. The risk analysis focused on whether the total RQs from all ingredients in the pesticide product and adjuvants could exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5.

For those application scenarios that had RQs above the applicable LOC, a qualitative assessment was conducted. Several common qualitative assessments were utilized, and the discussion below presents the rationale forming the basis of these qualitative assessments. It also includes specific measures that can be implemented to decrease the potential for adverse effects. This logic is referred to for specific application scenarios later in this section, but the reader is referred to the full rationale presented here.

6.1 Potential for a Species to Be Present at the Application Site

One of the first qualitative attributes to consider is the likelihood of the specific species being present at a particular application site. This ERA was conducted assuming all species would be present at an application site. This is clearly not likely as species exist in particular habitats and not all habitats can occur at a single application site. For instance, if the application site does not contain suitable foraging habitat for a particular species, it is relatively unlikely to come into the area and be exposed to pesticide active or inert ingredient or adjuvants by ingestion. Pollinating species are less likely to be present if there are no plants in bloom present. Some locations are unlikely to have any species present, such as the loading dock area of a nursery. Marine/estuarine species would be absent if the application site is not near the coastline.

CDFA's standard practice prior to implementing any pesticide application scenario is to identify whether any special-status species habitat is nearby, and if so, identify appropriate measures to avoid adversely affecting the species. As part of this, CDFA obtains technical assistance from California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), and/or United States Fish and Wildlife Service (USFWS). Examples of these measures include:

- Conduct application at times when the species is unlikely to be present.
- Ensure an adequate buffer distance is maintained to minimize the concentrations of pesticide active or inert ingredient or adjuvants that reach surrounding habitat by drift or run-off.

- Spray pots on impermeable surfaces to prevent leaching pesticide active or inert ingredient or adjuvants to native soil.

With implementation of this standard practice, the potential for adverse effects on species as a result of Proposed Program pesticides applications would be low.

6.2 Foraging Diet

The extent to which a particular species consumes food from the application area will greatly influence their exposure. Different species forage over vastly different areas. The analysis presented three different assumptions for the percentage of foraging range that would be within the application area. This was done to show the range of variabilities that may occur depending on the extent to which a particular species consumes vegetation or other organisms from within the application area. Species with large foraging areas are unlikely to consume all their diet from within an application area. Long-term exposures (chronic) are reduced or diluted in such species because a portion of their diets area is likely acquired off the application area. Refer to the discussion of AUFs in Section 3.3.

6.3 Dilution and Degradation of Chemicals

Through time, concentrations of chemicals following pesticides applications generally decrease. The models used in the quantitative risk assessment have limited capabilities to fully incorporate the numerous fate mechanisms which cause the pesticide active or inert ingredient or adjuvants to dissipate in the environment. Thus, in many instances, the concentrations that would likely occur would be less than the values modeled in the quantitative risk assessment. In the case of chronic exposures, the concentrations would be considerably lower than estimated. This applies in particular to soil and water concentrations. In addition to overestimation of concentrations due to chemical breakdown, dilution (or reduction in concentration when mixed) will occur when the pesticide active or inert ingredient or adjuvant residues combine with environmental media that is not contaminated. For instance, during a rain event that assists in transporting pesticide active or inert ingredient or adjuvant residue from foliage and soil to a waterbody, additional, uncontaminated water will add to the volume of water in the waterbody itself. This also applies to water concentrations as the pesticide active or inert ingredient or adjuvant continues to move from various waterbodies, such as drainage ditches, streams, and rivers. Due to dilution and low probability of application scenarios being adjacent to a marine/estuarine waterbody, the potential for elevated concentrations in marine/estuarine waterbodies would be relatively low, and the potential for adverse effects to marine/estuarine species would be correspondingly low.

It is CDFA's practice to ensure measures are taken to prevent pesticide applications from directly reaching a waterbody. CDFA's protection measures for surface waters were presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a). Indirect pathways would likely have lower concentrations than predicted by the quantitative model. Therefore, the actual risk to aquatic organisms would be lower than predicted. Specific BMPs are required for specific applications conducted by CDFA under their National Pollutant Discharge Elimination System (NPDES) permit.

6.4 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications on Nursery Loading Docks using Safari 20 SG (PDCP-64)

The risk analysis focused on whether the RQs resulting from foliar applications of Safari 20 SG, with or without No Foam B, applied on nursery loading docks exceed the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ exceeds the standard LOC suggesting exposures to non-T&E species might be harmful, the T&E LOC (which provides additional protection to special-status species) is necessarily exceeded. The potential for risk from active and inert ingredients in Safari 20 SG and ingredients in No Foam B was included in this analysis.

Considerable detail was included in the analysis of risk for control of GWSS. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs are exceeded. Foliar applications of Safari 20 SG for the control of GWSS would be made to containerized nursery stock prior to shipment while on the loading dock. Deposition to the loading dock surface beneath the containerized nursery stock is possible. Applications would be made up to 150 times per year at 2-day intervals on a nursery loading dock. Additionally, as described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

In the PDCP, Safari 20 SG (PDCP-64) applied as a foliar treatment on a nursery loading dock at 2-day application intervals was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-2** presents the acute and chronic RQs associated with scenario PDCP-64 when No Foam B is included as part of the tank mix, and **Table Eco-3** presents the acute and chronic RQs associated with scenario PDCP-64 when only Safari 20 SG is applied. Those RQs that exceed the standard LOC of 1.0 appear as bold text, whereas those RQs that exceed both the T&E LOC of 0.5 and standard LOC appear in bold italics.

6.4.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceed LOCs following applications of Safari 20 SG on nursery loading docks with or without No Foam B. No acute or chronic RQs for terrestrial-phase amphibians exceed LOCs following applications of Safari 20 SG on nursery loading docks with or without No Foam B. Therefore, foliar uses of Safari 20 SG on a nursery loading dock is not thought likely to be harmful for aquatic-phase or terrestrial-phase amphibians.

6.4.2 Risk to Aquatic Invertebrates

Foliar applications of Safari 20 SG, with or without No Foam B, do not result in acute RQs that exceed LOCs for freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates. Foliar applications of Safari 20 SG with or without No Foam B do not result in chronic RQs that exceed LOCs for freshwater vernal pool fairy shrimp, the estuarine mimic tryonia, or the marine black abalone. Foliar treatments on nursery loading docks of Safari 20 SG with No Foam B result in chronic RQs that exceed the T&E LOC for freshwater pool-dwelling Tomales isopod. The T&E LOC is also exceeded for the freshwater riverine California

freshwater shrimp and Shasta crayfish. Considering that the level of dilution that would occur in flowing water that could not be modeled appropriately with PWC, the estimated water concentration for these riverine species is unlikely to occur, and such exceedances for California freshwater shrimp and Shasta crayfish are unlikely to result from real-world concentrations in flowing water bodies. If No Foam B is eliminated from the tank mix, no exceedances for any aquatic invertebrates occurred. Foliar applications of Safari 20 SG, with or without No Foam B, do not result in any RQs that exceed that standard LOC for any aquatic invertebrates.

Implementation of the Program Management Practices presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of No Foam B constituents that might move to surface waters. Water concentrations in surface water following applications of Safari 20 SG or No Foam B are anticipated to be much lower than the modeled concentrations because of PWC model limitations and Program Management Practices described in the PEIR (CDFA, 2014a). Therefore, the potential for adverse effects is thought to be low to aquatic invertebrates following applications of Safari 20 SG, with or without No Foam B, on nursery loading docks.

6.4.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceed LOCs. Therefore, use of Safari 20 SG, with or without No Foam B as a foliar treatment on nursery loading docks is not thought likely to be harmful for fish.

6.4.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceed LOCs. Therefore, use of Safari 20 SG as a foliar treatment on nursery loading docks, with or without No Foam B, is not thought likely to be harmful for reptiles.

6.4.5 Risk to Birds

No acute RQs for any birds exceed LOCs.

Chronic RQs exceed the T&E LOC for the tricolored blackbird and yellow rail, both of which have diets focusing on prey from freshwater pools. However, the RQs only exceed LOCs when no AUF is applied. If no AUF is applied, it would be assumed that all prey is acquired in freshwater pools immediately adjacent to nursery loading docks. If No Foam B is eliminated from the tank mix, no chronic RQs exceed LOCs for tricolored blackbird and yellow rail. For the tricolored blackbird, preventing residues of Safari 20G and No Foam B from reaching surface water and a 25-ft. buffer to any terrestrial foraging habitat is sufficient to reduce exposure sufficiently that no chronic RQs exceed LOCs.

Implementation of the Program Management Practices presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of No Foam B constituents that might move to surface waters. Water concentrations in surface water following applications of No Foam B are anticipated to be much lower than the modeled concentrations because of PWC model limitations and Program Management Practices described in the PEIR.

The other birds with chronic RQs that exceed LOC are the western yellow-billed cuckoo and purple martin, which have diets consisting of crawling or flying insects, respectively. Exceedances only occurred when a higher than expected proportion of their diet (Midpoint AUF) is from treated areas, or all their diet (No AUF) is from treated areas. If No Foam B is removed from the tank mix, the degree by which the chronic RQs exceed the LOCs are reduced, but the exceedances are not eliminated. Considering the small size of the nursery loading docks, 3750 $ft.^2$, it is unlikely that a larger than expected proportion of their diet could be acquired from treated nursery loading docks.

For those species that consume prey from freshwater pools, the Program Management Practices are considered sufficient to reduce exposure such that any potential for adverse effects from foliar applications of Safari 20 SG with No Foam B is low. The small size of the nursery loading dock makes it unlikely that birds that forage on terrestrial insects will acquire a greater than anticipated proportion of their diets from treated nursery loading docks leading to the conclusion that the potential for adverse effects for terrestrial foraging birds is also low.

6.4.6 Risk to Mammals

Foliar applications of Safari 20 SG with No Foam B result in acute RQs that exceed the standard LOC for the freshwater riverine southwestern river otter and the marine southern sea otter. Foliar applications of Safari 20 SG with No Foam B also result in chronic RQs that exceed the standard LOC, but only when a higher than expected proportion of their diet (Midpoint AUF) is from waters adjacent to treated areas, or all their diets (No AUF) is from waters adjacent to treated areas. Considering that movement of pesticide active or inert ingredient or adjuvants into rivers and marine habitats would result in dilution that cannot be modeled with PWC, the real-world concentration of that pesticide active or inert ingredient or adjuvant is anticipated to be less for these riverine and marine species than the PWC output. Therefore, it is unlikely the exceedances for southwestern river otter and southern sea otter would occur from real-world concentrations in flowing water bodies or marine habitats. No acute or chronic RQs for southwestern river otter or southern sea otter is exceeded LOCs if No Foam B is removed from the tank mix. Therefore, use of Safari 20 SG, with or without No Foam B as a foliar treatment on nursery loading docks, is not likely to be harmful for riverine or marine mammals.

Foliar applications of Safari 20 SG with No Foam B result in acute RQs that exceed the standard LOC for the terrestrial riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel. Foliar applications of Safari 20 SG with No Foam B also result in chronic RQs that exceed LOCs for mule deer, riparian brush rabbit, northwestern San Diego pocket mouse, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel. Implementing a 25-ft. buffer to foraging habitat for northwestern San Diego pocket mouse sufficiently reduces exposure so no chronic RQs exceed LOCs. For the other terrestrial mammals listed above, when a 25-ft. buffer is incorporated, the only chronic RQ that exceeds LOCs occurs when no AUF is incorporated (i.e., the animals always consume all their food from areas within 25 ft. of a nursery loading dock).

The only mammal with exceedances of RQs following applications of Safari 20 SG on nursery loading docks without No Foam B is the big free-tailed bat. The only exceedance occurs for

chronic RQs when the big free-tailed bat acquires all its flying insect prey from within the 3750-ft.^{2} area of the nursery loading dock for the entire chronic exposure period (No AUF). Considering the small size of the nursery loading dock, acquiring all its diet for long periods from solely the nursery loading dock seems unlikely.

For those species that consume prey from riverine and marine habitats, the Program Management Practices as well as the likely dilution factors in these habitats are considered sufficient to reduce exposure such that any potential for adverse effects from foliar applications of Safari 20 SG with No Foam B is low. The small size of the nursery loading dock makes it unlikely that mammals that forage on insect or plant-based diets will acquire a greater than anticipated proportion of their diets from treated nursery loading docks or areas within approximately 25 ft. of the loading dock. Therefore, it can be concluded that the potential for adverse effects for terrestrial foraging mammals is also low.

6.4.7 Risk to Earthworms

The acute or chronic RQs for earthworms do not exceed any LOCs. Earthworms are assumed not to occur in the plant containers or beneath the containerized stock on the nursery loading dock. Therefore, use of Safari 20 SG with or without No Foam B as a foliar treatment is not thought likely to be harmful for soil-dwelling invertebrates.

6.4.8 Risk to Terrestrial Insects

When Safari 20 SG, with or without No Foam B, is applied as a foliar application on nursery loading docks under PDCP-64, terrestrial insects exposed via direct contact or consumption of pollen, nectar, and foliage have acute and chronic RQs that exceed LOCs. Applications to flowering plants, or drift to pollinator attractive habitat, must be minimized in accordance with label instructions. Since it is not possible to determine a proportion of flower plants that would be accidentally treated, the worst-case scenario that all flowering plants are treated is used to estimate exposure. In reality, few flowering plants will be available as forage for pollinators simply due to the small size (3750 ft.^{2}) of the nursery loading dock. Since few, if any, flowering plants would be treated, the estimated exposure is assumed to be exaggerated.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

Table Eco-2. Potential risk associated with Application Scenario PDCP-64—Foliar application of Safari 20 SG (Dinotefuran) at 0.22 lb. a.i./acre with No Foam B: 150 applications at 2-day interval to containerized stock on a nursery loading dock.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.02	0.10	0.10	0.10	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.02	0.10	0.10	0.10	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.02	0.10	0.10	0.10	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.02	0.04	0.04	0.04	0.00	0.00	0.00	0.00
Tomales isopod	0.08	***0.80***	***0.80***	***0.80***	0.00	0.00	0.00	0.00
Sacramento splittail	0.02	0.18	0.18	0.18	0.00	0.00	0.00	0.00
desert pupfish	0.02	0.10	0.10	0.10	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.02	0.00	0.36	***0.71***	0.00	0.00	0.02	0.04
fulvous whistling-duck	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00
yellow rail	0.03	0.00	0.49	***0.98***	0.00	0.00	0.03	0.05
Freshwater River Species								
aquatic arroyo toad	0.02	0.10	0.10	0.10	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.02	0.10	0.10	0.10	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00

Table Eco-2 PDCP-64 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.02	0.10	0.10	0.10	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.00	0.06	0.06	0.06	0.00	0.00	0.00	0.00
California freshwater shrimp	0.06	***0.52***	***0.52***	***0.52***	0.00	0.00	0.00	0.00
Shasta crayfish	0.06	***0.52***	***0.52***	***0.52***	0.00	0.00	0.00	0.00
arroyo chub	0.02	0.10	0.10	0.10	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.02	0.18	0.18	0.18	0.00	0.00	0.00	0.00
Chinook salmon	0.02	0.18	0.18	0.18	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.00
southwestern river otter	**4.90**	0.00	**4.26**	**8.51**	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.01	0.06	0.06	0.06	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.01	0.06	0.06	0.06	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00
southern sea otter	**2.54**	0.00	**2.23**	**4.46**	0.00	0.00	0.00	0.00

Table Eco-2 PDCP-64 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.00	0.03	0.06	0.09	0.00	0.00	0.00	0.01
terrestrial arroyo toad	0.00	0.06	0.08	0.10	0.00	0.00	0.00	0.01
terrestrial western spadefoot	0.00	0.01	0.06	0.11	0.00	0.00	0.00	0.01
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.01	0.00	0.06	0.12	0.00	0.00	0.00	0.01
western fence lizard	0.01	0.15	0.15	0.15	0.00	0.01	0.01	0.01
blunt-nosed leopard lizard	0.01	0.01	0.09	0.17	0.00	0.00	0.01	0.01
mourning dove	0.00	0.00	0.03	0.06	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
white-tailed kite	0.01	0.00	0.02	0.03	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.09	0.00	**1.28**	**2.55**	0.00	0.00	0.07	0.14
purple martin	0.05	0.00	***0.82***	**1.64**	0.00	0.00	0.04	0.09
mule deer	0.13	0.00	**1.51**	**3.03**	0.01	0.00	0.07	0.13
riparian brush rabbit	***0.78***	***0.62***	**9.29**	**17.96**	0.04	0.03	0.41	***0.79***
American badger	0.03	0.00	0.05	0.11	0.00	0.00	0.00	0.00

Table Eco-2 PDCP-64 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
northwestern San Diego pocket mouse	0.06	0.16	***0.78***	**1.40**	0.00	0.01	0.03	0.06
big free-tailed bat	***0.70***	0.00	**8.14**	**16.29**	0.03	0.00	0.37	***0.75***
southern grasshopper mouse	***0.62***	0.19	**7.29**	**14.40**	0.03	0.01	0.33	***0.66***
Nelson's antelope squirrel	***0.55***	0.06	**6.38**	**12.71**	0.03	0.00	0.29	***0.58***
earthworm	0.00	0.00	0.00	0.00	0.02	0.45	0.45	0.45
honey bee-adult (contact)	**198.00**				**1.64**			
honey bee-adult (oral)	**765.98**	0.05	**2349.02**	**4698.00**	**66.18**	0.00	**198.09**	**396.18**
Honey bee-larvae	**5.34**	0.00	**115.53**	**231.06**	0.20	0.00	**9.74**	**19.49**
Blennosperma vernal pool andrenid bee (contact)	**31.60**				0.26			
Blennosperma vernal pool andrenid bee (oral)	**765.98**				**66.18**			
San Joaquin tiger beetle (contact)	**31.60**				0.26			

Table Eco-3. Potential risk associated with Application Scenario PDCP-64 (Safari only)—Foliar application of Safari 20 SG (Dinotefuran) at 0.22 lb. a.i./acre: 150 applications at 2-day interval to containerized stock on a nursery loading dock.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tomales isopod	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.01	0.00	0.17	0.34	0.00	0.00	0.01	0.02
fulvous whistling-duck	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
yellow rail	0.02	0.00	0.24	0.47	0.00	0.00	0.01	0.03
Freshwater River Species								
aquatic arroyo toad	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00

Table Eco-3, PDCP-64 (Safari only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
California freshwater shrimp	0.04	0.41	0.41	0.41	0.00	0.00	0.00	0.00
Shasta crayfish	0.04	0.41	0.41	0.41	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00

Table Eco-3, PDCP-64 (Safari only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.00	0.01	0.03	0.04	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.00	0.03	0.04	0.04	0.00	0.00	0.00	0.00
terrestrial western spadefoot	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.03	0.06	0.00	0.00	0.00	0.00
western fence lizard	0.00	0.07	0.07	0.07	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.00	0.01	0.04	0.08	0.00	0.00	0.00	0.01
mourning dove	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.04	0.00	***0.59***	**1.17**	0.00	0.00	0.04	0.08
purple martin	0.03	0.00	0.39	***0.77***	0.00	0.00	0.02	0.05
mule deer	0.01	0.00	0.02	0.04	0.00	0.00	0.00	0.00
riparian brush rabbit	0.08	0.01	0.13	0.26	0.01	0.00	0.01	0.02
American badger	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00

Table Eco-3, PDCP-64 (Safari only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	0.07	0.00	0.27	***0.54***	0.01	0.00	0.02	0.04
southern grasshopper mouse	0.07	0.01	0.24	0.48	0.00	0.00	0.02	0.04
Nelson's antelope squirrel	0.06	0.00	0.21	0.42	0.00	0.00	0.02	0.03
earthworm	0.00	0.00	0.00	0.00	0.01	0.16	0.16	0.16
honey bee-adult (contact)	**198.00**				**1.64**			
honey bee-adult (oral)	**765.98**	0.05	**2349.02**	**4699.00**	**66.18**	0.00	**198.09**	**396.18**
Honey bee-larvae	**5.34**	0.00	**115.53**	**231.06**	0.20	0.00	**9.74**	**19.49**
Blennosperma vernal pool andrenid bee (contact)	**31.60**				0.26			
Blennosperma vernal pool andrenid bee (oral)	**765.98**				**66.18**			
San Joaquin tiger beetle (contact)	**31.60**				0.26			

6.5 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications in Nursery Production Areas using Safari 20 SG (PDCP-65)

The risk analysis focused on whether the RQs resulting from foliar applications of Safari 20 SG, with or without No Foam B, in nursery production areas exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ exceeds the standard LOC suggesting exposures to non-T&E species might be harmful, the T&E LOC (which provides additional protection to special-status species) is necessarily exceeded. The potential for risk from inert ingredients in Safari 20 SG and ingredients in No Foam B is included in this analysis.

Considerable detail was included in the analysis of risk for control of GWSS. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs are exceeded. Foliar applications of Safari 20 SG for the control of GWSS would be made to containerized nursery stock while maintained in nursery production areas. Deposition to the nursery production area surface beneath the containerized nursery stock is possible. Applications would be made up to 2 times per year at 90-day intervals in a nursery production area. Additionally, as described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

In the PDCP, Safari 20 SG (PDCP-65) applied as a foliar treatment in nursery production areas at 90-day application intervals was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-4** presents the acute and chronic RQs associated with scenario PDCP-65 when No Foam B is included as part of the tank mix, and **Table Eco-5** presents the acute and chronic RQs associated with scenario PDCP-65 when only Safari 20 SG is applied. Those RQs that exceed the standard LOC of 1.0 appear as bold text, whereas those RQs that exceed both the T&E LOC of 0.5 and standard LOC appear in bold italics.

6.5.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceed LOCs following applications of Safari 20 SG in nursery production areas with or without No Foam B. No acute or chronic RQs for terrestrial-phase amphibians exceed LOCs following applications of Safari 20 SG in nursery production areas with or without No Foam B. Therefore, foliar use of Safari 20 SG in nursery production areas is not thought likely to be harmful for aquatic-phase or terrestrial-phase amphibians.

6.5.2 Risk to Aquatic Invertebrates

Foliar applications of Safari 20 SG, with or without No Foam B, do not result in acute or chronic RQs that exceed LOCs for freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates. Therefore, foliar use of Safari 20 SG in nursery production areas is not thought likely to be harmful for freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates.

6.5.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceed LOCs. Therefore, use of Safari 20 SG, with or without No Foam B, as a foliar treatment in nursery production areas is not thought likely to be harmful for fish.

6.5.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceed LOCs. Therefore, use of Safari 20 SG, with or without No Foam B, as a foliar treatment in nursery production areas is not thought likely to be harmful for reptiles.

6.5.5 Risk to Birds

No acute RQs for any birds exceed LOCs.

No chronic RQs exceed LOCs for birds with aquatic diets. Chronic RQs exceed the T&E LOC for the western yellow-billed cuckoo and the purple martin with diets that consist of crawling or flying insects, respectively. Exceedances only occurred when all their diets (No AUF) is from treated areas. If the only suitable foraging habitat is at least 25 ft. from the treated nursery production areas, the exposure is sufficiently reduced such that no LOCs would be exceeded. If No Foam B is removed from the tank mix, the degree by which the chronic RQs exceed the LOCs are reduced, but the exceedances are not eliminated for western yellow-billed cuckoo on the nursery production area. Considering the general cleanliness of most nurseries, it is unlikely that a bird such as purple martin could find sufficient flying insect prey or western yellow-billed cuckoo could find sufficient crawling insects to consistently be able to acquire all their diet from treated nursery production areas.

The relatively small size of the treated nursery production areas (0.75 acres) makes it unlikely that birds that forage on terrestrial insects will acquire all their diets from treated nursery production areas leading to the conclusion that the potential for adverse effects for terrestrial foraging birds is also low.

6.5.6 Risk to Mammals

Foliar applications of Safari 20 SG with No Foam B result in acute RQs that exceed the T&E LOC for the terrestrial riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel. Foliar applications of Safari 20 SG with No Foam B also result in chronic RQs that exceed LOCs, for riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel. Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

Considering the relatively small size of the treated nursery production areas compared to the very large foraging area of big free-tailed bat, acquiring all its diet for long periods from just the treated nursery production areas seems unlikely. Species such as riparian brush rabbit, southern grasshopper mouse, and Nelson's antelope squirrel, with their smaller foraging areas, have a

greater potential to forage largely within the nursery production areas. The levels of exposure away from the treated portion of the nursery production areas diminishes quickly as shown by the EECs **(Appendix Eco-B)** and the very low chronic RQs when a 25-ft. buffer is considered. The relatively small size of the nursery production areas makes it unlikely that mammals that forage on insect or plant-based diets will acquire a sufficient proportion of their diets from treated nursery production area. Thus, the potential for adverse effects on terrestrial foraging mammals is low.

6.5.7 Risk to Earthworms

The acute RQs for earthworms do not exceed any LOCs. However, the chronic RQs for earthworms exceed the standard LOC when No Foam B is included in the tank mix and the T&E LOC when only Safari 20 SG is applied. Therefore, use of Safari 20 SG with or without No Foam B as a foliar treatment has the potential to cause chronic adverse effects for soil-dwelling invertebrates in nursery production areas.

6.5.8 Risk to Terrestrial Insects

Direct contact from spray or oral exposure to pollen, nectar, or foliage of plants treated with Safari 20 SG, with or without No Foam B as a foliar application in nursery production areas leads to acute and chronic RQs that exceed LOCs. Applications to flowering plants, or drift to pollinator attractive habitat must be minimized in accordance with label instructions. Since it is not possible to determine a proportion of flowering plants that would be accidentally treated, the worst-case scenario that all flowering plants are treated is used to estimate exposure. In reality, few flowering plants will be available as forage for pollinators simply due to the small size (0.75 acres) of the treated nursery production areas compared to the large foraging range of many pollinators and the fact that many host plants maintained in nursery production areas would not be flowering. Since few if any flowering plants would be treated, the estimated exposure is assumed to be exaggerated.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

Table Eco-4. Potential risk associated with Application Scenario PDCP-65—Foliar application of Safari 20 SG (Dinotefuran) at 0.22 lb. a.i./acre with No Foam B: 2 applications at 90-day interval to containerized stock to 0.75 acres in a nursery production area.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tomales isopod	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.02	0.00	0.13	0.26	0.00	0.00	0.00	0.00
fulvous whistling-duck	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
yellow rail	0.03	0.01	0.19	0.36	0.00	0.00	0.00	0.00
Freshwater River Species								
aquatic arroyo toad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-4, PDCP-65 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
California freshwater shrimp	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
Shasta crayfish	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southwestern river otter	0.26	0.00	0.15	0.30	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southern sea otter	0.13	0.00	0.08	0.15	0.00	0.00	0.00	0.00

Table Eco-4, PDCP-65 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.00	0.04	0.04	0.04	0.00	0.00	0.00	0.00
terrestrial western spadefoot	0.00	0.03	0.04	0.04	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.01	0.00	0.02	0.05	0.00	0.00	0.00	0.00
western fence lizard	0.01	0.06	0.06	0.06	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.01	0.05	0.06	0.07	0.00	0.00	0.00	0.00
mourning dove	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.09	0.01	0.50	***0.98***	0.00	0.00	0.00	0.00
purple martin	0.05	0.00	0.30	***0.60***	0.00	0.00	0.00	0.00
mule deer	0.13	0.00	0.49	***0.98***	0.00	0.00	0.00	0.00
riparian brush rabbit	***0.78***	**1.74**	**3.76**	**5.79**	0.01	0.01	0.03	0.05
American badger	0.03	0.00	0.02	0.03	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.06	0.46	0.46	0.46	0.00	0.00	0.00	0.00

Table Eco-4, PDCP-65 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	***0.70***	0.00	**2.72**	**5.43**	0.01	0.00	0.02	0.05
southern grasshopper mouse	***0.62***	***0.55***	**2.67**	**4.80**	0.01	0.00	0.02	0.04
Nelson's antelope squirrel	***0.55***	0.17	**2.20**	**4.24**	0.00	0.00	0.02	0.04
earthworm	0.10	**1.56**	**1.56**	**1.56**	0.00	0.01	0.01	0.01
honey bee-adult (contact)	**198.00**				**1.64**			
honey bee-adult (oral)	**774.29**	0.23	**1228.69**	**2457.14**	**6.43**	0.00	**10.20**	**20.39**
Honey bee-larvae	**2.30**	0.01	**60.43**	**120.85**	0.02	0.00	***0.50***	**1.00**
Blennosperma vernal pool andrenid bee (contact)	**31.60**				0.26			
Blennosperma vernal pool andrenid bee (oral)	**774.29**				**6.43**			
San Joaquin tiger beetle (contact)	**31.60**				0.26			

Table Eco-5. Potential risk associated with Application Scenario PDCP-65 (Safari only)—Foliar application of Safari 20 SG (Dinotefuran) at 0.22 lb. a.i./acre: 2 applications at 90-day interval to containerized stock to 0.75 acres in a nursery production area.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tomales isopod	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.01	0.00	0.07	0.13	0.00	0.00	0.00	0.00
fulvous whistling-duck	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
yellow rail	0.01	0.01	0.10	0.19	0.00	0.00	0.00	0.00
Freshwater River Species								
aquatic arroyo toad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-5, PDCP-65 (Safari only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
California freshwater shrimp	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Shasta crayfish	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-5, PDCP-65 (Safari only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial western spadefoot	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
western fence lizard	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
mourning dove	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.04	0.01	0.26	***0.51***	0.00	0.00	0.00	0.00
purple martin	0.02	0.00	0.16	0.32	0.00	0.00	0.00	0.00
mule deer	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00
riparian brush rabbit	0.08	0.03	0.07	0.11	0.00	0.00	0.00	0.00
American badger	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-5, PDCP-65 (Safari only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
		Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	0.07	0.00	0.13	0.26	0.00	0.00	0.00	0.00
southern grasshopper mouse	0.07	0.03	0.13	0.23	0.00	0.00	0.00	0.00
Nelson's antelope squirrel	0.06	0.01	0.11	0.21	0.00	0.00	0.00	0.00
earthworm	0.04	***0.53***	***0.53***	***0.53***	0.00	0.00	0.00	0.00
Acute honey bee-adult (contact)	**198.00**				**1.64**			
honey bee-adult (oral)	**77429**	0.23	**1228.69**	**2457.14**	**6.43**	0.00	**10.20**	**20.39**
Honey bee-larvae	**2.30**	0.01	**60.43**	**120.85**	0.02	0.00	***0.50***	**1.00**
Blennosperma vernal pool andrenid bee (contact)	**31.60**				0.26			
Blennosperma vernal pool andrenid bee (oral)	**774.29**				**6.43**			
San Joaquin tiger beetle (contact)	**31.60**				0.26			

6.6 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications to the Entire Nursery using Safari 20 SG (PDCP-66)

The risk analysis focused on whether the RQs resulting from foliar applications of Safari 20 SG to the entire nursery using ground spray equipment (PDCP-66) or aerial applications (PDCP-66 Aerial) exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ exceeds the standard LOC suggesting exposures to non-T&E species might be harmful, the T&E LOC (which provides additional protection to special-status species) is necessarily exceeded. The potential for risk from inert ingredients in Safari 20 SG is included in this analysis.

Considerable detail was included in the analysis of risk for control of GWSS. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs are exceeded. Foliar applications of Safari 20 SG for the control of GWSS would be made to containerized nursery stock while maintained throughout the entire nursery production areas. Deposition to the nursery production area surface beneath the containerized nursery stock is possible. Applications would be made once per year to the entire nursery production area. Additionally, as described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

In the PDCP, Safari 20 SG using ground equipment (PDCP-66) or aerially (PDCP-66 Aerial) applied as a foliar treatment to the entire nursery production areas once per year was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-6** presents the acute and chronic RQs associated with scenario PDCP-66 when applications are made with ground equipment, and **Table Eco-7** presents the acute and chronic RQs associated with scenario PDCP-66 Aerial when only Safari 20 SG is applied aerially. Those RQs that exceed the standard LOC of 1.0 appear as bold text, whereas those RQs that exceed both the T&E LOC of 0.5 and standard LOC appear in bold italics.

6.6.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceed LOCs following applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment. No acute or chronic RQs for terrestrial-phase amphibians exceed LOCs following applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment. Therefore, foliar use of Safari 20 SG in nursery production areas is not likely to be harmful to aquatic-phase or terrestrial-phase amphibians.

6.6.2 Risk to Aquatic Invertebrates

Foliar applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment do not result in acute RQs that exceed LOCs for freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates. Foliar applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment do not result in chronic

RQs that exceed LOCs for freshwater pool-dwelling, estuarine, or marine invertebrates. Foliar treatments of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment result in chronic RQs that exceed the T&E LOC for the freshwater riverine California freshwater shrimp and Shasta crayfish. Considering that the level of dilution that would occur in flowing water that could not be modeled appropriately with PWC, the estimated water concentration for these riverine species is unlikely to occur, and such exceedances for California freshwater shrimp and Shasta crayfish are unlikely to result from real-world concentrations in flowing water bodies. Foliar applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment do not result in any RQs that exceed that standard LOC for any aquatic invertebrates.

Implementation of the Program Management Practices presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of Safari 20 SG that might move to surface waters. Water concentrations in surface water following applications of Safari 20 SG are anticipated to be much lower than the modeled concentrations because of PWC model limitations and Program Management Practices described in the PEIR. Therefore, the potential is thought to be low for adverse effects to aquatic invertebrates following applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment.

6.6.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceed LOCs. Therefore, applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment is not likely to be harmful to fish.

6.6.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceed LOCs. Therefore, applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment is not likely to be harmful to reptiles.

6.6.5 Risk to Birds

No acute or chronic RQs for birds exceed LOCs. Therefore, applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment is not likely to be harmful to birds.

6.6.6 Risk to Mammals

No acute or chronic RQs for mammals exceed LOCs. Therefore, applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment is not likely to be harmful to mammals.

6.6.7 Risk to Earthworms

No acute or chronic RQs for earthworms exceed LOCs. Therefore, applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment is not likely to be harmful to soil-dwelling invertebrates.

6.6.8 Risk to Terrestrial Insects

Direct contact from spray or oral exposure to pollen, nectar, or foliage of plants following applications of Safari 20 SG to the entire nursery production areas using ground or aerial spray equipment leads to acute and chronic RQs that exceed LOCs. Applications to flowering plants, or drift to pollinator attractive habitat must be minimized in accordance with label instructions. Since it is not possible to determine a proportion of flowering plants that would be accidentally treated, the worst-case scenario that all flowering plants are treated is used to estimate exposure. In reality, few flowering plants might be available as forage for pollinators simply due to the fact that many host plants maintained in nursery production areas would not be flowering. Since few if any flowering plants would be treated, the estimated exposure is assumed to be exaggerated.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

Table Eco-6. Potential risk associated with Application Scenario PDCP-66—Foliar application of Safari 20 SG (Dinotefuran) at 0.22 lb. a.i./acre: 1 application per year to containerized stock to the entire nursery (130 acres) using ground equipment.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Tomales isopod	0.01	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Sacramento splittail	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
desert pupfish	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
tricolored blackbird	0.02	0.00	0.10	0.21	0.00	0.00	0.00	0.00
fulvous whistling-duck	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
yellow rail	0.02	0.27	0.27	0.27	0.00	0.00	0.00	0.00
Freshwater River Species								
aquatic arroyo toad	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00

Table Eco-6, PDCP-66 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
California freshwater shrimp	0.09	***0.85***	***0.85***	***0.85***	0.00	0.00	0.00	0.00
Shasta crayfish	0.09	***0.85***	***0.85***	***0.85***	0.00	0.00	0.00	0.00
arroyo chub	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Chinook salmon	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
osprey	0.01	0.00	0.04	0.07	0.00	0.00	0.00	0.00
southwestern river otter	0.01	0.00	0.02	0.03	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.01	0.00	0.04	0.08	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00

Table Eco-6, PDCP-66 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial western spadefoot	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
western fence lizard	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00
mourning dove	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.04	0.48	0.48	0.48	0.00	0.00	0.00	0.00
purple martin	0.03	0.43	0.43	0.43	0.00	0.00	0.00	0.00
mule deer	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00
riparian brush rabbit	0.08	0.11	0.11	0.11	0.00	0.00	0.00	0.00
American badger	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-6, PDCP-66 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
		Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	0.07	0.00	0.12	0.25	0.00	0.00	0.00	0.00
southern grasshopper mouse	0.07	0.22	0.22	0.22	0.00	0.00	0.00	0.00
Nelson's antelope squirrel	0.06	0.19	0.19	0.19	0.00	0.00	0.00	0.00
earthworm	0.03	0.45	0.45	0.45	0.00	0.00	0.00	0.00
Acute honey bee-adult (contact)	**198.00**				**1.64**			
honey bee-adult (oral)	**765.98**	**37.54**	**1173.80**	**2310.07**	**6.35**	0.31	**9.74**	**19.17**
Honey bee-larvae	**2.28**	**1.85**	**57.73**	**113.61**	0.02	0.02	0.48	***0.94***
Blennosperma vernal pool andrenid bee (contact)	**31.60**				0.26			
Blennosperma vernal pool andrenid bee (oral)	**765.98**				**6.36**			
San Joaquin tiger beetle (contact)	**31.60**				0.26			

Table Eco-7. Potential risk associated with Application Scenario PDCP-66 Aerial—Foliar application of Safari 20 SG (Dinotefuran) at 0.22 lb. a.i./acre: 1 application per year to containerized stock to the entire nursery (130 acres) from an aircraft.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Tomales isopod	0.01	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Sacramento splittail	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
desert pupfish	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
tricolored blackbird	0.02	0.00	0.11	0.21	0.00	0.00	0.00	0.00
fulvous whistling-duck	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
yellow rail	0.02	0.28	0.28	0.28	0.00	0.00	0.00	0.00
Freshwater River Species								
aquatic arroyo toad	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00

Table Eco-7, PDCP-66 Aerial (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
California freshwater shrimp	0.09	***0.87***	***0.87***	***0.87***	0.00	0.00	0.00	0.00
Shasta crayfish	0.09	***0.87***	***0.87***	***0.87***	0.00	0.00	0.00	0.00
arroyo chub	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Chinook salmon	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
osprey	0.01	0.00	0.04	0.07	0.00	0.00	0.00	0.00
southwestern river otter	0.01	0.00	0.02	0.03	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.01	0.00	0.04	0.09	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00

Table Eco-7, PDCP-66 Aerial (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
terrestrial western spadefoot	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
western fence lizard	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
mourning dove	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.04	0.48	0.48	0.48	0.00	0.00	0.00	0.00
purple martin	0.03	0.43	0.43	0.43	0.00	0.00	0.00	0.00
mule deer	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00
riparian brush rabbit	0.08	0.11	0.11	0.11	0.00	0.00	0.00	0.00
American badger	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-7, PDCP-66 Aerial (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
		Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	0.07	0.00	0.12	0.25	0.00	0.00	0.00	0.00
southern grasshopper mouse	0.07	0.22	0.22	0.22	0.00	0.00	0.00	0.00
Nelson's antelope squirrel	0.06	0.19	0.19	0.19	0.00	0.00	0.00	0.00
earthworm	0.03	0.45	0.45	0.45	0.00	0.00	0.00	0.00
Acute honey bee-adult (contact)	**198.00**				**1.64**			
honey bee-adult (oral)	**765.98**	**37.54**	**1173.80**	**2310.07**	**6.36**	0.31	**9.74**	**19.17**
Honey bee-larvae	**2.28**	**1.85**	**57.73**	**113.61**	0.02	0.02	0.48	***0.94***
Blennosperma vernal pool andrenid bee (contact)	**31.60**				0.26			
Blennosperma vernal pool andrenid bee (oral)	**765.98**				**6.36**			
San Joaquin tiger beetle (contact)	**31.60**				0.26			

6.7 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications in Urban/Residential Settings using Merit 2F (PDCP-70)

The risk analysis focused on whether the RQs resulting from foliar applications of Merit 2F in urban/residential settings exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ exceeds the standard LOC suggesting exposures to non-T&E species might be harmful, the T&E LOC (which provides additional protection to special-status species) is necessarily exceeded. The potential for risk from inert ingredients in Merit 2F is included in this analysis.

Considerable detail was included in the analysis of risk for control of GWSS. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs are exceeded. Foliar applications of Merit 2F for the control of GWSS would be made to host plants in urban/residential areas. Deposition to the soil or turf beneath the host plants is possible. Applications would be made once per year to roughly a third of the 15-acre area surrounding where a GWSS was found. Additionally, as described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

In the PDCP, Merit 2F applied as a foliar treatment to the host plants in an urban/residential setting once per year was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-8** presents the acute and chronic RQs associated with scenario PDCP-70 when foliar applications are made for the control of GWSS. Those RQs that exceed the standard LOC of 1.0 appear as bold text, whereas those RQs that exceed both the T&E LOC of 0.5 and standard LOC appear in bold italics.

6.7.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceed LOCs. No acute or chronic RQs exceed LOCs for terrestrial phase amphibians when applications are made in urban/residential settings. Therefore, foliar use of Merit 2F in urban/residential areas is not likely to be harmful to aquatic-phase or terrestrial-phase amphibians.

6.7.2 Risk to Aquatic Invertebrates

No acute or chronic RQs for marine/estuarine or freshwater aquatic invertebrates exceed LOCs. Therefore, foliar applications of Merit 2F in urban/residential areas is not likely to be harmful to aquatic invertebrates.

6.7.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceed LOCs. Therefore, foliar applications of Merit 2F in urban/residential areas is not likely to be harmful to fish.

6.7.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceed LOCs. Therefore, use of Merit 2F as a foliar treatment is not likely to be harmful to reptiles.

6.7.5 Risk to Birds

The acute RQs do not exceed LOCs following foliar applications with Merit 2F for all bird species except the western yellow-billed cuckoo which has a diet of crawling insects. The chronic RQs do not exceed LOCs following foliar applications with Merit 2F for all bird species except the tricolored blackbird with a mixed diet of both terrestrial and aquatic foods, western yellow-billed cuckoo, and purple martin with a diet of flying insects. For species such as tricolored blackbird and purple martin, chronic RQs only exceed LOCs when more than expected proportions of their food is acquired from treated areas (Midpoint AUF and No AUF). For tricolored blackbird, residues from Merit 2F must be prevented from reaching water. Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

6.7.6 Risk to Mammals

No acute or chronic RQs for mammals exceed LOCs. Therefore, use of Merit 2F as a foliar treatment is not likely to be harmful to mammals.

6.7.7 Risk to Earthworms

No acute or chronic RQs for earthworms exceed LOCs. Therefore, use of Merit 2F as a foliar treatment is not likely to be harmful to soil-dwelling invertebrates.

6.7.8 Risk to Terrestrial Insects

Direct contact from spray or oral exposure to pollen, nectar, or foliage of plants following foliar applications of Merit 2F to urban/residential areas lead to acute and chronic RQs that exceed LOCs. No plants currently flowering will be treated in accordance with label instructions. Since it is not possible to determine a proportion of flowering plants that would be accidentally treated or accumulate residues via uptake from the soil following treatment, the worst-case scenario that all flowering plants are treated is used to estimate exposure. Since few if any flowering plants would be treated, the estimated exposure is assumed to be exaggerated.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

Table Eco-8. Potential risk associated with Application Scenario PDCP-70—Foliar application of Merit 2F (imidacloprid) at 0.023 lb. a.i./acre: 1 application per year to landscape host material in an urban/residential setting in an area within 150 m of a glassy-winged sharpshooter find (15 acres).

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.02	0.02	0.02	0.00	0.02	0.02	0.02
aquatic western spadefoot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tomales isopod	0.01	0.07	0.07	0.07	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.18	0.00	***0.50***	**1.01**	0.18	0.00	0.49	***0.97***
fulvous whistling-duck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
yellow rail	0.05	0.07	0.08	0.09	0.05	0.07	0.08	0.09
Freshwater River Species								
aquatic arroyo toad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00

Table Eco-8, PDCP-70 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.02	0.09	0.09	0.09	0.02	0.08	0.08	0.08
California freshwater shrimp	0.01	0.07	0.07	0.07	0.00	0.00	0.00	0.00
Shasta crayfish	0.01	0.07	0.07	0.07	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-8, PDCP-70 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.02	0.13	0.13	0.13	0.02	0.13	0.13	0.13
terrestrial arroyo toad	0.03	0.14	0.14	0.14	0.03	0.14	0.14	0.14
terrestrial western spadefoot	0.03	0.16	0.16	0.16	0.03	0.16	0.16	0.16
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
western fence lizard	0.00	0.02	0.02	0.02	0.00	0.02	0.02	0.02
blunt-nosed leopard lizard	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02
mourning dove	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Cooper's hawk	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
western yellow-billed cuckoo	***0.70***	**1.13**	**2.44**	**3.75**	***0.70***	**1.13**	**2.44**	**3.75**
purple martin	0.43	0.35	**1.35**	**2.34**	0.43	0.34	**1.31**	**2.28**
mule deer	0.01	0.00	0.02	0.04	0.01	0.00	0.02	0.04
riparian brush rabbit	0.07	0.26	0.26	0.26	0.07	0.26	0.26	0.26
American badger	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
northwestern San Diego pocket mouse	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02
big free-tailed bat	0.07	0.00	0.12	0.24	0.07	0.00	0.12	0.24

Table Eco-8, PDCP-70 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water
		Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
southern grasshopper mouse	0.06	0.21	0.21	0.21	0.06	0.21	0.21	0.21
Nelson's antelope squirrel	0.05	0.15	0.17	0.19	0.05	0.15	0.17	0.19
earthworm	0.01	0.08	0.08	0.08	0.01	0.08	0.08	0.08
honey bee-adult (contact)	**3.61**				**3.61**			
honey bee-adult (oral) Acute	**471.84**	**1.54**	**410.74**	**819.95**	**471.84**	**1.54**	**410.74**	**819.58**
Honey bee-larvae	0.19	0.06	**15.56**	**31.07**	0.19	0.06	**15.56**	**31.07**
Blennosperma vernal pool andrenid bee (contact)	0.35				0.35			
Blennosperma vernal pool andrenid bee (oral)	**471.84**				**471.84**			
San Joaquin tiger beetle (contact)	0.35				0.35			

Table Eco-8, PDCP-70 (Cont.)

	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species				
aquatic California tiger salamander	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00
Tomales isopod	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00
tricolored blackbird	0.00	0.00	0.00	0.01
fulvous whistling-duck	0.00	0.00	0.00	0.00
yellow rail	0.00	0.00	0.00	0.00
Freshwater River Species				
aquatic arroyo toad	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.00	0.00	0.00

Table Eco-8, PDCP-70 (Cont.)

	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.00	0.00	0.00	0.00
California freshwater shrimp	0.00	0.00	0.00	0.00
Shasta crayfish	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00
Estuarine Species				
mimic tryonia	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00
Marine Species				
black abalone	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00

Table Eco-8, PDCP-70 (Cont.)

	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species				
terrestrial California tiger salamander	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.00	0.00	0.00	0.00
terrestrial western spadefoot	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.00	0.00
western fence lizard	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.00	0.00	0.00	0.00
mourning dove	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.01	0.01	0.02	0.03
purple martin	0.00	0.00	0.01	0.02
mule deer	0.00	0.00	0.00	0.00
riparian brush rabbit	0.00	0.00	0.00	0.00
American badger	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.00	0.00	0.00	0.00

Table Eco-8, PDCP-70 (Cont.)

	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	0.00	0.00	0.00	0.00
southern grasshopper mouse	0.00	0.00	0.00	0.00
Nelson's antelope squirrel	0.00	0.00	0.00	0.00
earthworm	0.00	0.00	0.00	0.00
honey bee-adult (contact)	0.03			
honey bee-adult (oral)	**3.92**	0.01	**3.41**	**6.80**
Honey bee-larvae	0.00	0.00	0.13	0.26
Blennosperma vernal pool andrenid bee (contact)	0.00			
Blennosperma vernal pool andrenid bee (oral)	**3.92**			
San Joaquin tiger beetle (contact)	0.00			

6.8 Risk Analysis for the Pierce's Disease Control Program's Soil Drench and Soil Injection Applications in Urban/Residential Settings using Merit 2F (PDCP-71 & PDCP-72)

The risk analysis focused on whether the RQs resulting from soil drench or soil injection applications of Merit 2F in urban/residential settings exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ exceeds the standard LOC suggesting exposures to non-T&E species might be harmful, the T&E LOC (which provides additional protection to special-status species) is necessarily exceeded. The potential for risk from inert ingredients in Merit 2F is included in this analysis.

Considerable detail was included in the analysis of risk for control of GWSS. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs are exceeded. Soil drench or soil injection applications of Merit 2F for the control of GWSS would be made beneath host plants in urban/residential areas. Substantial deposition to foliage of the host plants is unlikely. Applications would be made once per year to roughly a third of the 15-acre area surrounding where a GWSS was found. Additionally, as described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

In the PDCP, Merit 2F applied as a soil drench (PDCP-71) or soil injection (PDCP-72) treatment to the host plants in an urban/residential setting once per year were not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-9** presents the acute and chronic RQs associated with scenario PDCP-71 when soil drench applications are made for the control of GWSS. The exposure for ecological receptors following a soil injection application would be the same or possibly slightly less than following a soil drench application. Therefore only the results for PDCP-71 are presented, but these same results represent the potential for risk following a soil injection application also. Those RQs that exceed the standard LOC of 1.0 appear as bold text, whereas those RQs that exceed both the T&E LOC of 0.5 and standard LOC appear in bold italics.

6.8.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceed LOCs. No acute or chronic RQs exceed LOCs for terrestrial phase amphibians when applications are made in urban/residential settings. Therefore, soil drench or soil injection applications of Merit 2F in urban/residential areas are not likely to be harmful to aquatic-phase or terrestrial-phase amphibians.

6.8.2 Risk to Aquatic Invertebrates

Soil drench or soil injection applications of Merit 2F do not result in acute RQs that exceed LOCs for freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates. Soil drench or soil injection applications of Merit 2F do not result in chronic RQs that exceed LOCs for freshwater vernal pool fairy shrimp, the estuarine mimic tryonia, or the marine black abalone. Soil drench or soil injection applications in urban/residential areas with Merit 2F result in

chronic RQs that exceed the T&E LOC for freshwater pool-dwelling Tomales isopod and the freshwater riverine California freshwater shrimp and Shasta crayfish. Considering that the level of dilution that would occur in flowing water that could not be modeled appropriately with PWC, the estimated water concentration for these riverine species is unlikely to occur, and such exceedances for California freshwater shrimp and Shasta crayfish are unlikely to result from real-world concentrations in flowing water bodies. Soil drench or soil injection applications of Merit 2F do not result in any RQs that exceed that standard LOC for any aquatic invertebrates.

Implementation of the Program Management Practices presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of Merit 2F that might move to surface waters. Water concentrations in surface water following applications of Merit 2F are anticipated to be much lower than the modeled concentrations because of PWC model limitations and Program Management Practices described in the PEIR. Therefore, the potential is low for adverse effects to aquatic invertebrates following applications of Merit 2F in urban/residential areas.

6.8.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceed LOCs. Therefore, soil drench or soil injection applications of Merit 2F in urban/residential areas are not likely to be harmful to fish.

6.8.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceed LOCs. Therefore, use of Merit 2F as a soil treatment is not likely to be harmful to reptiles.

6.8.5 Risk to Birds

The acute RQs do not exceed LOCs following soil drench or soil injection applications with Merit 2F for all bird species. The chronic RQs do not exceed LOCs following soil drench or soil injection applications with Merit 2F for all bird species except the purple martin with a diet of flying insects. Flying insects could acquire residues of imidacloprid after soil drench or soil injection by foraging on plants that have taken up imidacloprid from treated soil or after emerging from surface water contaminated following treatment. For species such as purple martin that consume both terrestrial and aquatic insects, chronic RQs only exceed LOCs when all their food is acquired from treated areas (No AUF). Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

6.8.6 Risk to Mammals

No acute or chronic RQs for mammals exceed LOCs. Therefore, use of Merit 2F as a soil drench or soil injection application is not likely to be harmful to mammals.

6.8.7 Risk to Earthworms

The acute RQs for earthworms exceed the standard LOC. The chronic RQs for earthworms exceed the standard LOC following soil drench or soil injection applications of Merit 2F. Therefore, use of Merit 2F for soil drench or soil injection applications has the potential to cause acute or chronic adverse effects for soil-dwelling invertebrates in urban/suburban areas.

6.8.8 Risk to Terrestrial Insects

No acute contact RQs for terrestrial insects, including pollinators, exceed LOCs. However, oral acute RQs exceed T&E LOCs and standard LOCs for adult honey bees and Blennosperma vernal pool andrenid bee, but not for the larval honey bees. Oral chronic RQs exceed LOCs for adult pollinators and larval honey bees when most (Midpoint AUF) or all (No AUF) their food is acquired from the treated area. Therefore, use of Merit 2F as a soil drench or soil injection application is not likely to be harmful for many terrestrial insects but could be harmful those that consume plant matter, including pollen or nectar from primarily within the treated area.

Table Eco-9. Potential risk associated with Application Scenario PDCP-71—Soil drench application of Merit 2F (imidacloprid) at 0.4 lb. a.i./acre: 1 applications per year beneath landscape host material in an urban/residential setting in an area within 150 m of a glassy-winged sharpshooter find (15 acres).

	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tomales isopod	0.11	***0.72***	***0.72***	***0.72***	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.02	0.00	0.25	0.49	0.00	0.00	0.05	0.09
fulvous whistling-duck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
yellow rail	0.01	0.03	0.03	0.04	0.00	0.00	0.00	0.00
Freshwater River Species								
aquatic arroyo toad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial southern torrent salamander	0.00	0.07	0.07	0.07	0.00	0.00	0.00	0.00

Table Eco-9, PDCP-71 (Cont.)

	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.00	0.03	0.03	0.03	0.00	0.01	0.01	0.01
California freshwater shrimp	0.11	***0.72***	***0.72***	***0.72***	0.00	0.00	0.00	0.00
Shasta crayfish	0.11	***0.72***	***0.72***	***0.72***	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00

Table Eco-9, PDCP-71 (Cont.)

	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
terrestrial arroyo toad	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
terrestrial western spadefoot	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western fence lizard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
mourning dove	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cooper's hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	0.01	0.05	0.11	0.17	0.01	0.05	0.11	0.17
purple martin	0.04	0.12	0.44	***0.77***	0.00	0.02	0.06	0.11
mule deer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
riparian brush rabbit	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
American badger	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
big free-tailed bat	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01

Table Eco-9, PDCP-71 (Cont.)

	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Baseline-Drench, 100% to Native Soil	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water	Reduced Exp.- No Residue to Water
		Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
southern grasshopper mouse	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
Nelson's antelope squirrel	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
earthworm	***0.87***	**6.85**	**6.85**	**6.85**	***0.87***	**6.85**	**6.85**	**6.85**
honey bee-adult (contact)	0.00				0.00			
honey bee-adult (oral)	**3.81**	0.06	**16.34**	**32.62**	**3.81**	0.06	**16.34**	**32.62**
Honey bee-larvae	0.00	0.00	***0.62***	**1.23**	0.00	0.00	***0.62***	**1.23**
Blennosperma vernal pool andrenid bee (contact)	0.00				0.00			
Blennosperma vernal pool andrenid bee (oral)	**3.81**				**3.81**			
San Joaquin tiger beetle (contact)	0.00				0.00			

Acute

6.9 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications on Nursery Loading Docks using Marathon II Greenhouse and Nursery Insecticide (PDCP-77)

The risk analysis focused on whether the RQs resulting from foliar applications of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B, applied on nursery loading docks exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ exceeds the standard LOC suggesting exposures to non-T&E species might be harmful, the T&E LOC (which provides additional protection to special-status species) is necessarily exceeded. The potential for risk from ingredients in No Foam B is included in this analysis.

Considerable detail was included in the analysis of risk for control of GWSS. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs are exceeded. Foliar applications of Marathon II Greenhouse and Nursery Insecticide for the control of GWSS would be made to containerized nursery stock prior to shipment while on the loading dock. Deposition to the loading dock surface beneath the containerized nursery stock is possible. Applications would be made up to 150 times per year at 2-day intervals on a nursery loading dock. Additionally, as described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

In the PDCP, Marathon II Greenhouse and Nursery Insecticide (PDCP-77) applied as a foliar treatment on a nursery loading dock at 2-day application intervals was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-10** presents the acute and chronic RQs associated with scenario PDCP-77 when No Foam B is included as part of the tank mix, and **Table Eco-11** presents the acute and chronic RQs associated with scenario PDCP-77 when only Marathon II Greenhouse and Nursery Insecticide is applied. Those RQs that exceed the standard LOC of 1.0 appear as bold text, whereas those RQs that exceed both the T&E LOC of 0.5 and standard LOC appear in bold italics.

6.9.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceed LOCs following applications of Marathon II Greenhouse and Nursery Insecticide on nursery loading docks with or without No Foam B. Therefore, foliar application of Marathon II Greenhouse and Nursery Insecticide on a nursery loading dock is not likely to be harmful for aquatic-phase amphibians.

No acute RQs for terrestrial-phase amphibians exceed LOCs following applications of Marathon II Greenhouse and Nursery Insecticide on nursery loading docks with or without No Foam B. However, chronic RQs exceed LOCs for terrestrial-phase foothill yellow-legged frog, California tiger salamander, arroyo toad, and western spadefoot following applications of Marathon II Greenhouse and Nursery Insecticide with or without No Foam B. However, chronic RQs exceed LOCs for some terrestrial-phase amphibians. Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

6.9.2 Risk to Aquatic Invertebrates

Foliar applications of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B, do not result in acute RQs that exceed LOCs for freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates. Foliar applications of Marathon II Greenhouse and Nursery Insecticide with or without No Foam B do not result in chronic RQs that exceed LOCs for freshwater vernal pool fairy shrimp, the estuarine mimic tryonia, or the marine black abalone. Foliar treatments on nursery loading docks of Marathon II Greenhouse and Nursery Insecticide with No Foam B result in chronic RQs that exceed the T&E LOC for freshwater pool-dwelling Tomales isopod. RQs exceed T&E LOCs for the freshwater riverine California freshwater shrimp and Shasta crayfish. Considering that the level of dilution that would occur in flowing water that could not be modeled appropriately with PWC, the estimated water concentration for these riverine species is unlikely to occur, and such exceedances for California freshwater shrimp and Shasta crayfish are unlikely to result from real-world concentrations in flowing water bodies. If No Foam B is eliminated from the tank mix, the same exceedances for aquatic invertebrates occurred.

Implementation of the Program Management Practices presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of No Foam B constituents that might move to surface waters. Water concentrations in surface water following applications of Marathon II Greenhouse and Nursery Insecticide are anticipated to be much lower than the modeled concentrations because of PWC model limitations and Program Management Practices described in the PEIR.

6.9.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceed LOCs. Therefore, use of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B as a foliar treatment on nursery loading docks is not likely to be harmful to fish.

6.9.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceed LOCs. Therefore, use of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B, as a foliar treatment on nursery loading docks is not likely to be harmful to reptiles.

6.9.5 Risk to Birds

The only bird species for which acute RQs exceed LOCs are the western yellow-billed cuckoo and purple martin. Elimination of No Foam B does not alter the degree to which acute RQs for these species exceed the T&E LOC.

Chronic RQs exceed the LOCs for the tricolored blackbird, and yellow rail that have diets focusing on prey from freshwater pools, but only when no AUF is applied. If no AUF is applied, it is assumed that all prey is acquired in freshwater pools immediately adjacent to nursery loading docks. If No Foam B is eliminated from the tank mix, the chronic RQs still exceed LOCs for tricolored blackbird and yellow rail. However, if residues are prevented from reaching surface waters and a 25-ft. buffer exists between the nursery loading dock and foraging habitat, no chronic RQs exceed LOCs.

Implementation of the Program Management Practices presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a) will greatly reduce the amount of Marathon II Greenhouse and Nursery Insecticide and No Foam B constituents that might move to surface waters. Water

concentrations in surface water following applications of Marathon II Greenhouse and Nursery Insecticide and No Foam B are anticipated to be much lower than the modeled concentrations because of PWC model limitations and Program Management Practices described in the PEIR.

The other birds with chronic RQs that exceed LOC are the western yellow-billed cuckoo and the purple martin with diets that consist of crawling or flying insects, respectively. Exceedances only occurred when a higher than expected proportion of their diet (Midpoint AUF) is from treated areas, or all their diets (No AUF) is from treated areas. If No Foam B is removed from the tank mix, the degree by which the chronic RQs exceed the LOCs are reduced, but the exceedances are not eliminated for the western yellow-billed cuckoo. Considering the small size of the nursery loading docks, 3750 $ft.^2$, it is unlikely that a larger than expected proportion of the western yellow-billed cuckoo's diet would be acquired from treated nursery loading docks.

For those species that consume prey from freshwater pools, the Program Management Practices are considered sufficient to reduce exposure such that any potential for adverse effects from foliar applications of Marathon II Greenhouse and Nursery Insecticide with or without No Foam B is low. The small size of the nursery loading dock makes it unlikely that birds that forage on terrestrial insects will acquire a greater than anticipated proportion of their diets from treated nursery loading docks leading to the conclusion that the potential for adverse effects for terrestrial foraging birds is also low.

6.9.6 Risk to Mammals

Foliar applications of Marathon II Greenhouse and Nursery Insecticide with No Foam B result in acute RQs that exceed the standard LOC for the freshwater riverine southwestern river otter and the marine southern sea otter. Foliar applications of Marathon II Greenhouse and Nursery Insecticide with No Foam B also result in chronic RQs that exceed the standard LOC, but only when a higher than expected proportion of their diet (Midpoint AUF) is from waters adjacent to treated areas, or all their diets (No AUF) is from waters adjacent to treated areas. Considering that the level of dilution that would occur in rivers or marine habitats water that could not be modeled appropriately with PWC, the estimated water concentration for these riverine and marine species is unlikely to occur, and such exceedances for southwestern river otter and southern sea otter are unlikely to result from real-world concentrations in flowing water bodies or marine habitats. No acute or chronic RQs for southwestern river otter or southern sea otter exceed LOCs if No Foam B is removed from the tank mix. Therefore, use of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B as a foliar treatment on nursery loading docks is not likely to be harmful to riverine or marine mammals.

Foliar applications of Marathon II Greenhouse and Nursery Insecticide with or without No Foam B do not result in any acute RQs that exceed the LOCs for the terrestrial foraging mammals. Foliar applications of Marathon II Greenhouse and Nursery Insecticide with No Foam B result in chronic RQs that exceed LOCs, for mule deer, riparian brush rabbit, northwestern San Diego pocket mouse, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel. Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

The only mammals with exceedances of RQs following applications of Marathon II Greenhouse and Nursery Insecticide on nursery loading docks without No Foam B are the riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel. The only exceedance occurs for chronic RQs when these species acquire more of their diet than anticipated (Midpoint

AUF) or all their diet (No AUF) from within the 3750-ft.^{2} area of the nursery loading dock for the entire chronic exposure period (No AUF). If the foraging habitat is at least 25 ft. from the loading dock, no LOC exceedances occur. Considering the small size of the nursery loading dock, acquiring all their diet for long periods from just the nursery loading dock seems unlikely. Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

For those species that consume prey from riverine and marine habitats, the Program Management Practices as well as the likely dilution factors in these habitats are considered sufficient to reduce exposure such that any potential for adverse effects from foliar applications of Marathon II Greenhouse and Nursery Insecticide with No Foam B is low. The small size of the nursery loading dock makes it unlikely that mammals that forage on insect or plant-based diets will acquire a greater than anticipated proportion of their diets from treated nursery loading docks leading to the conclusion that the potential for adverse effects for terrestrial foraging mammals is also low.

6.9.7 Risk to Earthworms

The acute or chronic RQs for earthworms do not exceed any LOCs. Earthworms are assumed not to occur in the plant containers or beneath the containerized stock on the nursery loading dock. Therefore, use of Marathon II Greenhouse and Nursery Insecticide with or without No Foam B as a foliar treatment is not likely to be harmful to soil-dwelling invertebrates.

6.9.8 Risk to Terrestrial Insects

Direct contact from spray or oral exposure to pollen, nectar, or foliage of plants treated with Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B as a foliar application on nursery loading docks leads to acute and chronic RQs that exceed LOCs. No plants currently flowering will be treated in accordance with label instructions. Since it is not possible to determine a proportion of flower plants that would be accidentally treated, the worst-case scenario that all flowering plants are treated is used to estimate exposure. In reality, few flowering plants will be available as forage for pollinators simply due to the small size (3750 ft.^{2}) of the nursery loading dock. Since few if any flowering plants would be treated, the estimated exposure is assumed to be exaggerated.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

Table Eco-10. Potential risk associated with Application Scenario PDCP-77—Foliar application of Marathon II Greenhouse and Nursery Insecticide (Imidacloprid) with No Foam B at 0.027 lb. a.i./acre: 150 applications at 2-day interval to containerized stock on a nursery loading dock.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.05	0.08	0.12	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.01	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Tomales isopod	0.11	**1.10**	**1.10**	**1.10**	0.00	0.00	0.00	0.00
Sacramento splittail	0.01	0.08	0.08	0.08	0.00	0.00	0.00	0.00
desert pupfish	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.23	0.00	**3.49**	**6.97**	0.01	0.00	0.09	0.18
fulvous whistling-duck	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
yellow rail	0.07	0.00	0.44	***0.87***	0.00	0.00	0.01	0.03
Freshwater River Species								
aquatic arroyo toad	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00

Table Eco-10, PDCP-77 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
terrestrial southern torrent salamander	0.00	0.01	0.04	0.07	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.02	***0.59***	***0.59***	***0.59***	0.00	0.02	0.02	0.02
California freshwater shrimp	0.09	***0.79***	***0.79***	***0.79***	0.00	0.00	0.00	0.00
Shasta crayfish	0.09	***0.79***	***0.79***	***0.79***	0.00	0.00	0.00	0.00
arroyo chub	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.01	0.08	0.08	0.08	0.00	0.00	0.00	0.00
Chinook salmon	0.01	0.08	0.08	0.08	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
southwestern river otter	**2.25**	0.00	**1.96**	**3.93**	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.01	0.03	0.03	0.03	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.01	0.03	0.03	0.03	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00
southern sea otter	**1.17**	0.00	**1.03**	**2.06**	0.00	0.00	0.00	0.00

Table Eco-10, PDCP-77 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.03	0.31	***0.61***	***0.90***	0.00	0.01	0.02	0.03
terrestrial arroyo toad	0.03	***0.55***	***0.76***	***0.97***	0.00	0.02	0.02	0.03
terrestrial western spadefoot	0.04	0.09	***0.60***	**1.10**	0.00	0.00	0.02	0.03
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.01	0.00	0.06	0.12	0.00	0.00	0.00	0.00
western fence lizard	0.01	0.15	0.15	0.15	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.01	0.01	0.09	0.17	0.00	0.00	0.00	0.01
mourning dove	0.00	0.00	0.03	0.06	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
white-tailed kite	0.01	0.00	0.01	0.03	0.00	0.00	0.00	0.00
Cooper's hawk	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	***0.84***	0.04	**12.70**	**25.35**	0.03	0.00	0.35	***0.70***
purple martin	***0.54***	0.01	**8.07**	**16.12**	0.02	0.00	0.21	0.43
mule deer	0.07	0.00	***0.83***	**1.66**	0.00	0.00	0.03	0.07
riparian brush rabbit	0.41	0.34	**5.09**	**9.85**	0.02	0.01	0.21	0.40
American badger	0.02	0.00	0.04	0.08	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.03	0.09	0.43	***0.77***	0.00	0.00	0.02	0.03

Table Eco-10, PDCP-77 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	0.37	0.00	**4.40**	**8.81**	0.02	0.00	0.18	0.37
southern grasshopper mouse	0.33	0.10	**3.94**	**7.78**	0.01	0.00	0.16	0.32
Nelson's antelope squirrel	0.29	0.03	**3.45**	**6.87**	0.01	0.00	0.14	0.29
earthworm	0.00	0.00	0.00	0.00	0.01	0.18	0.18	0.18
honey bee-adult (contact)	**4.24**				0.04			
honey bee-adult (oral)	**553.85**	0.06	**2700.03**	**5400.01**	**16.31**	0.00	**73.66**	**147.31**
Honey bee-larvae	***0.52***	0.00	**102.30**	**204.60**	0.01	0.00	**2.79**	**5.58**
Blennosperma vernal pool andrenid bee (contact)	0.41				0.00			
Blennosperma vernal pool andrenid bee (oral)	**553.85**				**16.31**			
San Joaquin tiger beetle (contact)	0.41				0.00			

Table Eco-11. Potential risk associated with Application Scenario PDCP-77 (Marathon II only)—Foliar application of Marathon II Greenhouse and Nursery Insecticide (Imidacloprid) at 0.027 lb. a.i./acre: 150 applications at 2-day interval to containerized stock on a nursery loading dock.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.05	0.08	0.11	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tomales isopod	0.08	***0.74***	***0.74***	***0.74***	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.23	0.00	**3.40**	**6.80**	0.01	0.00	0.09	0.17
fulvous whistling-duck	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
yellow rail	0.06	0.00	0.32	***0.64***	0.00	0.00	0.01	0.02
Freshwater River Species								
aquatic arroyo toad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-11, PDCP-77 (Marathon II Only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
terrestrial southern torrent salamander	0.00	0.01	0.04	0.07	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.02	***0.57***	***0.57***	***0.57***	0.00	0.02	0.02	0.02
California freshwater shrimp	0.08	***0.74***	***0.74***	***0.74***	0.00	0.00	0.00	0.00
Shasta crayfish	0.08	***0.74***	***0.74***	***0.74***	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00

Table Eco-11, PDCP-77 (Marathon II Only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.03	0.30	***0.59***	***0.88***	0.00	0.01	0.02	0.02
terrestrial arroyo toad	0.03	***0.54***	***0.74***	***0.94***	0.00	0.01	0.02	0.03
terrestrial western spadefoot	0.04	0.09	***0.58***	**1.07**	0.00	0.00	0.02	0.03
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.05	0.09	0.00	0.00	0.00	0.00
western fence lizard	0.01	0.12	0.12	0.12	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.01	0.01	0.07	0.13	0.00	0.00	0.00	0.00
mourning dove	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
white-tailed kite	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00
Cooper's hawk	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	***0.82***	0.04	**12.38**	**24.72**	0.02	0.00	0.34	***0.67***
purple martin	***0.52***	0.01	**7.87**	**15.73**	0.01	0.00	0.21	0.41
mule deer	0.01	0.00	0.15	0.29	0.00	0.00	0.00	0.01
riparian brush rabbit	0.09	0.06	***0.89***	**1.72**	0.00	0.00	0.02	0.05
American badger	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.00

Table Eco-11, PDCP-77 (Marathon II Only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
northwestern San Diego pocket mouse	0.01	0.02	0.08	0.14	0.00	0.00	0.00	0.00
big free-tailed bat	0.08	0.00	***0.79***	**1.58**	0.00	0.00	0.02	0.04
southern grasshopper mouse	0.07	0.02	***0.71***	**1.39**	0.00	0.00	0.02	0.04
Nelson's antelope squirrel	0.06	0.01	***0.62***	**1.23**	0.00	0.00	0.02	0.03
earthworm	0.00				0.01			
honey bee-adult (contact)	**4.24**				0.04			
honey bee-adult (oral)	**553.85**	0.06	**2700.03**	**5400.01**	**16.34**	0.00	**73.66**	**147.31**
Honey bee-larvae	***0.52***	0.00	**102.30**	**204.60**	0.01	0.00	**2.79**	**5.58**
Blennosperma vernal pool andrenid bee (contact)	0.41				0.00			
Blennosperma vernal pool andrenid bee (oral)	**553.85**				**16.34**			
San Joaquin tiger beetle (contact)	0.41				0.00			

6.10 Risk Analysis for the Pierce's Disease Control Program's Foliar Applications in Nursery Production Areas using Marathon II Greenhouse and Nursery Insecticide (PDCP-78)

The risk analysis focused on whether the RQs resulting from foliar applications of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B, in nursery production areas exceed the LOCs, either the standard LOC of 1.0 or the T&E LOC of 0.5. It is important to remember that whenever an RQ exceeds the standard LOC suggesting exposures to non-T&E species might be harmful, the T&E LOC (which provides additional protection to special-status species) is necessarily exceeded. The potential for risk from ingredients in No Foam B is included in this analysis.

Considerable detail was included in the analysis of risk for control of GWSS. This detail was provided to discuss specifics of exposures for various surrogate species and how such exposures could influence whether LOCs are exceeded. Foliar applications of Marathon II Greenhouse and Nursery Insecticide for the control of GWSS would be made to containerized nursery stock while maintained in nursery production areas. Deposition to the nursery production area surface beneath the containerized nursery stock is possible. Applications would be made up to 2 times per year at 180-day intervals in a nursery production area. Additionally, as described in Section 2.10.2 of the Main Body of the Statewide PEIR (CDFA, 2014a), CDFA will consult as necessary with CDFW to ensure that there are no adverse effects on the species by implementing suitable buffers or other suitable measures.

In the PDCP, Marathon II Greenhouse and Nursery Insecticide (PDCP-78) applied as a foliar treatment in nursery production areas at 180-day application intervals was not already evaluated in the Statewide PEIR (CDFA, 2014a). **Table Eco-12** presents the acute and chronic RQs associated with scenario PDCP-78 when No Foam B is included as part of the tank mix, and **Table Eco-13** presents the acute and chronic RQs associated with scenario PDCP-78 when only Marathon II Greenhouse and Nursery Insecticide is applied. Those RQs that exceed the standard LOC of 1.0 appear as bold text, whereas those RQs that exceed both the T&E LOC of 0.5 and standard LOC appear in bold italics.

6.10.1 Risk to Amphibians

No acute or chronic RQs for aquatic-phase amphibians exceed LOCs following applications of Marathon II Greenhouse and Nursery Insecticide in nursery production areas with or without No Foam B. No acute or chronic RQs for terrestrial-phase amphibians exceed LOCs following applications of Marathon II Greenhouse and Nursery Insecticide in nursery production areas with or without No Foam B. Therefore, foliar use of Marathon II Greenhouse and Nursery Insecticide in nursery production areas is not likely to be harmful to aquatic-phase or terrestrial-phase amphibians.

6.10.2 Risk to Aquatic Invertebrates

Foliar applications of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B, do not result in acute or chronic RQs that exceed LOCs for freshwater pool-dwelling,

freshwater riverine, estuarine, or marine invertebrates. Therefore, foliar use of Marathon II Greenhouse and Nursery Insecticide in nursery production areas is not likely to be harmful to freshwater pool-dwelling, freshwater riverine, estuarine, or marine invertebrates.

6.10.3 Risk to Fish

No acute or chronic RQs for marine/estuarine or freshwater fish exceed LOCs. Therefore, use of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B, as a foliar treatment in nursery production areas is not likely to be harmful to fish.

6.10.4 Risk to Reptiles

No acute or chronic RQs for reptiles exceed LOCs. Therefore, use of Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B, as a foliar treatment in nursery production areas is not likely to be harmful to reptiles.

6.10.5 Risk to Birds

The acute RQs do not exceed LOCs following foliar applications with Marathon II Greenhouse and Nursery Insecticide with or without No Foam B for all bird species except the western yellow-billed cuckoo which has a diet of crawling insects and the purple martin with a diet of flying insects. The chronic RQs do not exceed LOCs following foliar applications with Merit 2F for all bird species except the tricolored blackbird with a mixed diet of both terrestrial and aquatic foods, western yellow-billed cuckoo, and purple martin. For species such as tricolored blackbird, western yellow-billed cuckoo, and purple martin, chronic RQs only exceed LOCs when more than expected proportions of their food is acquired from treated areas (Midpoint AUF and No AUF). For these species, and those they represent, residues of Marathon II Greenhouse and Nursery Insecticide and No Foam B must be prevented from reaching water. Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

The relatively small size of the treated nursery production areas (0.75 acres) makes it unlikely that birds that forage on terrestrial insects will acquire all their diets from treated nursery production areas leading to the conclusion that the potential for adverse effects for terrestrial foraging birds is also low.

6.10.6 Risk to Mammals

Foliar applications of Marathon II Greenhouse and Nursery Insecticide with No Foam B do not result in acute RQs that exceed the T&E LOC for any mammals. Foliar applications of Marathon II Greenhouse and Nursery Insecticide with No Foam B result in chronic RQs that exceed LOCs, for riparian brush rabbit, big free-tailed bat, southern grasshopper mouse, and Nelson's antelope squirrel. If No Foam B is eliminated from the tank mix, no chronic RQs exceed LOCs.

Considering the relatively small size of the treated nursery production areas compared to the very large foraging area of big free-tailed bat, it is unlikely that the bat will acquire all its diet for long periods from just the treated nursery production areas. Species such as riparian brush rabbit,

southern grasshopper mouse, and Nelson's antelope squirrel, with their smaller foraging areas, have a greater potential to forage largely within the nursery production areas. Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

6.10.7 Risk to Earthworms

The acute RQs for earthworms do not exceed any LOCs. However, the chronic RQs for earthworms exceed the T&E LOC when No Foam B is included in the tank mix, but no chronic RQs exceed LOCs when only Marathon II Greenhouse and Nursery Insecticide is applied. Therefore, use of Marathon II Greenhouse and Nursery Insecticide used as a foliar treatment has the potential to cause chronic adverse effects for soil-dwelling invertebrates in nursery production areas when No Foam B is included but not when No Foam B is excluded.

6.10.8 Risk to Terrestrial Insects

Direct contact from spray or oral exposure to pollen, nectar, or foliage of plants treated with Marathon II Greenhouse and Nursery Insecticide, with or without No Foam B as a foliar application in nursery production areas leads to acute and chronic RQs that exceed LOCs. In accordance with label instructions, no plants currently flowering will be treated. Since it is not possible to determine a proportion of flowering plants that would be accidentally treated, the worst-case scenario that all flowering plants are treated is used to estimate exposure. In reality, few flowering plants will be available as forage for pollinators simply due to the small size (0.75) of the treated nursery production areas and the fact that many host plants maintained in nursery production areas would not be flowering. Since few if any flowering plants would be treated, the estimated exposure is assumed to be exaggerated.

If pollinators or other special-status terrestrial insects are present, CDFA will implement its pollinator protection practices as described in Appendix K of the Statewide PEIR (CDFA, 2014a). Implementation of a buffer from the application site to foraging habitat or other site-specific measures would sufficiently reduce exposure and chronic RQs would not be expected to exceed LOCs.

Table Eco-12. Potential risk associated with Application Scenario PDCP-78—Foliar application of Marathon II Greenhouse and Nursery Insecticide (Imidacloprid) with No Foam B at 0.027 lb. a.i./acre: 2 times a year at a 180-day interval to containerized stock in a nursery production area.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tomales isopod	0.01	0.07	0.07	0.07	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.22	0.00	***0.71***	**1.43**	0.00	0.00	0.01	0.01
fulvous whistling-duck	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
yellow rail	0.07	0.01	0.11	0.21	0.00	0.00	0.00	0.00
Freshwater River Species								
aquatic arroyo toad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-12, PDCP-78 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
terrestrial southern torrent salamander	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.02	0.12	0.12	0.12	0.00	0.00	0.00	0.00
California freshwater shrimp	0.01	0.06	0.06	0.06	0.00	0.00	0.00	0.00
Shasta crayfish	0.01	0.06	0.06	0.06	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southwestern river otter	0.10	0.00	0.06	0.12	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southern sea otter	0.05	0.00	0.03	0.06	0.00	0.00	0.00	0.00

Table Eco-12, PDCP-78 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.03	0.19	0.19	0.19	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.03	0.21	0.21	0.21	0.00	0.00	0.00	0.00
terrestrial western spadefoot	0.04	0.18	0.21	0.24	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.01	0.00	0.01	0.03	0.00	0.00	0.00	0.00
western fence lizard	0.01	0.04	0.04	0.04	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.01	0.03	0.04	0.04	0.00	0.00	0.00	0.00
mourning dove	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Cooper's hawk	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	***0.84***	0.08	**2.75**	**5.41**	0.01	0.00	0.02	0.04
purple martin	***0.51***	0.03	**1.68**	**3.34**	0.00	0.00	0.01	0.03
mule deer	0.07	0.00	0.25	0.50	0.00	0.00	0.00	0.00
riparian brush rabbit	0.41	***0.89***	**1.93**	**2.96**	0.00	0.01	0.02	0.02
American badger	0.02	0.00	0.01	0.02	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.03	0.24	0.24	0.24	0.00	0.00	0.00	0.00

Table Eco-12, PDCP-78 (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	0.37	0.00	**1.35**	**2.70**	0.00	0.00	0.01	0.02
southern grasshopper mouse	0.33	0.27	**1.33**	**2.39**	0.00	0.00	0.01	0.02
Nelson's antelope squirrel	0.29	0.08	**1.09**	**2.11**	0.00	0.00	0.01	0.02
earthworm	0.04	***0.53***	***0.53***	***0.53***	0.00	0.00	0.00	0.00
honey bee-adult (contact)	**4.24**				0.04			
honey bee-adult (oral)	**553.85**	0.11	**567.69**	**1135.27**	**4.60**	0.00	**4.71**	**9.42**
Honey bee-larvae	0.22	0.00	**21.51**	**43.01**	0.00	0.00	0.18	0.36
Blennosperma vernal pool andrenid bee (contact)	0.41				0.00			
Blennosperma vernal pool andrenid bee (oral)	**553.85**				**4.60**			
San Joaquin tiger beetle (contact)	0.41				0.00			

Table Eco-13. Potential risk associated with Application Scenario PDCP-78 (Marathon II only)—Foliar application of Marathon II Greenhouse and Nursery Insecticide (Imidacloprid) at 0.027 lb. a.i./acre: 2 times a year at a 180-day interval to containerized stock in a nursery production area.

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic California red-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial California red-legged frog	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
aquatic western spadefoot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vernal pool fairy shrimp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tomales isopod	0.01	0.05	0.05	0.05	0.00	0.00	0.00	0.00
Sacramento splittail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert pupfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
giant garter snake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western pond turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tricolored blackbird	0.21	0.00	***0.69***	**1.37**	0.00	0.00	0.01	0.01
fulvous whistling-duck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
yellow rail	0.06	0.01	0.07	0.13	0.00	0.00	0.00	0.00
Freshwater River Species								
aquatic arroyo toad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
aquatic southern torrent salamander	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-13, PDCP-78 (Marathon II Only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
terrestrial southern torrent salamander	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
aquatic foothill yellow-legged frog	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
terrestrial foothill yellow-legged frog	0.02	0.12	0.12	0.12	0.00	0.00	0.00	0.00
California freshwater shrimp	0.01	0.05	0.05	0.05	0.00	0.00	0.00	0.00
Shasta crayfish	0.01	0.05	0.05	0.05	0.00	0.00	0.00	0.00
arroyo chub	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
coastal cutthroat trout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinook salmon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
osprey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southwestern river otter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
tidewater goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
delta smelt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine Species								
black abalone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Pacific green sea turtle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California brown pelican	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
southern sea otter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table Eco-13, PDCP-78 (Marathon II Only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
Terrestrial Species								
terrestrial California tiger salamander	0.03	0.18	0.18	0.18	0.00	0.00	0.00	0.00
terrestrial arroyo toad	0.03	0.20	0.20	0.20	0.00	0.00	0.00	0.00
terrestrial western spadefoot	0.04	0.17	0.20	0.23	0.00	0.00	0.00	0.00
Alameda whipsnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
northern red diamond rattlesnake	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
desert tortoise	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
western fence lizard	0.01	0.02	0.02	0.02	0.00	0.00	0.00	0.00
blunt-nosed leopard lizard	0.01	0.02	0.02	0.03	0.00	0.00	0.00	0.00
mourning dove	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
California condor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
white-tailed kite	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cooper's hawk	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
western yellow-billed cuckoo	***0.82***	0.08	**2.64**	**5.20**	0.01	0.00	0.02	0.04
purple martin	***0.50***	0.02	**1.62**	**3.21**	0.00	0.00	0.01	0.03
mule deer	0.01	0.00	0.03	0.06	0.00	0.00	0.00	0.00
riparian brush rabbit	0.09	0.11	0.23	0.36	0.00	0.00	0.00	0.00
American badger	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
northwestern San Diego pocket mouse	0.01	0.03	0.03	0.03	0.00	0.00	0.00	0.00

Table Eco-13, PDCP-78 (Marathon II Only) (Cont.)

	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Baseline- No Drift Buffer to Water or Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat
	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF	Acute	Chronic AUF	Chronic Midpoint AUF	Chronic No AUF
big free-tailed bat	0.08	0.00	0.17	0.33	0.00	0.00	0.00	0.00
southern grasshopper mouse	0.07	0.03	0.16	0.29	0.00	0.00	0.00	0.00
Nelson's antelope squirrel	0.06	0.01	0.13	0.26	0.00	0.00	0.00	0.00
earthworm	0.01	0.11	0.11	0.11	0.00	0.00	0.00	0.00
honey bee-adult (contact)	**4.24**				0.04			
honey bee-adult (oral)	**553.85**	0.11	**567.69**	**1135.27**	**4.60**	0.00	**4.71**	**9.42**
Honey bee-larvae	0.22	0.00	**21.51**	**43.01**	0.00	0.00	0.18	0.36
Blennosperma vernal pool andrenid bee (contact)	0.41				0.00			
Blennosperma vernal pool andrenid bee (oral)	**553.85**				**4.60**			
San Joaquin tiger beetle (contact)	0.41				0.00			

7 Uncertainties

Uncertainty in ecological risk assessment derives partly from biological variability. The response of ecological receptors following exposure to contaminants will vary among individuals within a species as well as across species. Also, literature values from various species are used to predict the response of the surrogate species of interest in this ERA. The differences among species always introduces unavoidable uncertainty to an ERA. Uncertainty regarding predictions in a risk assessment may be due to inherent randomness, limited knowledge, or lack of knowledge (Suter, 2007: p. 69).

A common practice in ERAs is to apply uncertainty factors to various values used in calculations to estimate potential risk. In this ERA, we applied uncertainty factors to toxicity endpoints in the development of TRVs when the ideal value (*e.g.*, acute or chronic NOAELs) is not available. In the development of TRVs (Section 4 of the ERA as part of the Statewide PEIR), the uncertainty factors suggested by the U.S. Army (2000) and USEPA (2004) were used. Uncertainty factors were also applied when using the biomagnification factor (BMF) to estimate tissue concentration in predatory terrestrial vertebrates. In this instance, using the BMF from shrews developed by Armitage and Gobas (2007) and applying that BMF to terrestrial vertebrates is novel and no published references were available for determining appropriate uncertainty factors. Professional judgment is used in assigning uncertainty factors to the shrew BMF.

7.1 Exposure Assessment Uncertainties

In this ERA, exposure of ecological receptors could not be directly measured. Models were used to estimate exposure following applications of Safari 20 SG, Merit 2F, and Marathon II Greenhouse and Nursery Insecticide. The use of models to estimate exposure necessarily introduces uncertainty regarding how well those models will predict the exposure that actually occurs following applications. Reliance on exposure models developed by the USEPA was intended to standardize the approach here and to reduce the potential of underestimating exposure.

7.1.1 Application Scenarios

Safari 20 SG, Merit 2F, and Marathon II Greenhouse and Nursery Insecticide application scenarios were based on descriptions provided by CDFA staff. Where a range of conditions were possible, such as the area of an application site, CDFA staff were requested to provide conditions that were ‘reasonably foreseeable’ and tending toward worse case. The most common conditions under which applications were likely to be made were analyzed, but some uncommon conditions that could lead to greater or lesser exposure than the scenarios represented in the risk assessment were not analyzed. For example, to produce a quantitative estimate of risk, the area of application needed to be defined. It is certainly possible that smaller or larger application areas than used in this ERA could occur in the future.

For urban/residential application scenarios, the application area was defined as a 15-acre area representing the entire area within the prescribed 150-m distance from a GWSS find. Treatments

will be applied to host plants only. Within an application area, many features would not be treated such as pavement, buildings, and lawns. Following the approach used in PEIR Addenda 1 and 2, it was assumed approximately one-third of the entire area was treated. Since it is not possible to know how many host plants would exist within the 15-acre application area, assuming one-third of the area is treated adds uncertainty.

7.1.2 Aquatic Exposure Assessment

Water concentrations used to estimate exposure for drinking water of terrestrial species or for uptake into aquatic prey were based on outputs from USEPA's PWC model (USEPA, 2017c). PWC did not provide a means to appropriately estimate water concentrations in surface water that was not immediately adjacent to the application site. The inability to accurately model concentrations in water bodies not immediately adjacent to application sites tended to produce an overestimate for water concentrations. The resulting risk estimates would therefore be exaggerated.

Water concentrations in PWC are based on what would occur in a 1-ha (2.471-acre) waterbody. In reality, a wide variety of water bodies could be adjacent to application sites. Estimated concentrations from PWC for vernal pools or other water bodies that are smaller and shallower than the modeled waterbody would be low. However, where water bodies were larger, the estimates were likely greatly exaggerated. PWC did not allow for estimated water concentrations in a flowing water body. Any water movement would lead to an overestimation of water concentrations by PWC.

Uptake from water into aquatic prey was estimated using KABAM (USEPA, 2009s). KABAM had a limitation in the range of chemicals for which it provided appropriate tissue concentrations. Chemicals with Log K_{ow} outside the range of 4 to 8 were not appropriate for use with KABAM. However, KABAM is a model developed by USEPA for estimating tissue concentrations and no other USEPA model exists for chemicals outside the range of Log K_{ow} of 4 to 8. It is not known whether use of KABAM on chemicals with Log K_{ow} outside the ideal range would produce under or overestimates of tissue concentrations.

No attempt was made to eliminate food items, such as aquatic invertebrates or fish that might have died from exposure to the pesticide prior to being available for consumption. Since it is unlikely that dead prey would be consumed, failure to eliminate dead prey would have produced an overestimation of exposure.

7.1.3 Marine/Estuarine Exposure Assessment

No models were available for estimating water concentrations in marine/estuarine environments. Many of the same uncertainties existed for marine/estuarine environments as for freshwater environments. It is not known how a more saline environment might affect the outputs from the models. PWC was expected to greatly exaggerate the water concentrations in marine/estuarine habitats because of the much larger volume of water present in the marine/estuarine environments and the routine flushing of the areas from tides and wave action.

7.1.4 Terrestrial Exposure Assessment

Whenever EECs are based on modeled residues, uncertainty exists regarding the representativeness of the model outputs. T-REX, the model used for many of the EECs in terrestrial food items was developed from empirical data for vegetation (Hoerger and Kenaga, 1972, Fletcher *et al.*, 1994), but also estimates residues on food items such as fruits, seeds and insects. The model has been updated to better estimate residues on insects (USEPA, 2012i), but residues on seeds were not based on empirical data. Without empirical data to evaluate seed residues, the accuracy of the estimated concentrations is not known. However, by using models developed by the USEPA, every effort was made to reduce the chances that exposure was underestimated. Also, the husks of many seeds or fruits might be discarded when wildlife eat them, which would cause the EEC used in the ERA to be greater than actual exposure and risks overestimated.

Systemic residues taken up by plants or terrestrial invertebrates were based primarily on the K_{ow} of the pesticide active or inert ingredient or adjuvant and assumed to be instantaneous. In reality, uptake from an environmental media such as soil or water would occur over an extended time period making any acute EECs selected shortly after an application an overestimation of what was actually present within the plant or animal tissue. Many factors can influence the rate of uptake in plants. Water soluble chemicals are taken up more quickly when plants are actively transpiring and water is available for uptake (*i.e.*, they are not under drought conditions). Other pesticide active or inert ingredients or adjuvants will be taken up more quickly when plants are actively metabolizing and absorbing nutrients. The actual rate will depend on chemical characteristics and the conditions at the time of and following an application. The one thing that can be known for sure is that the uptake will not be instantaneous.

Concentrations of pesticide active or inert ingredient or adjuvants in soil were based on the amount concentrated in the upper 15 cm. Residues were assumed to instantaneously be distributed throughout the soil column. For an acute exposure to soil in the diet, such an assumption of instantaneous distribution would lead to an underestimation of exposure to concentrations in surface soils immediately following an application as the pesticide active or inert ingredients or adjuvants may not have had a chance to migrate through the full 15 cm. Since many pesticide active or inert ingredients or adjuvants are known to penetrate deeper than 15 cm (*e.g.,* Ramanand *et al*., 1988; Zhang *et al*., 2000), limiting the penetration zone to only 15 cm leads to an overestimation of chronic exposures.

Tissue concentrations in terrestrial vertebrate prey were assumed to be equivalent to the daily intake of a pesticide active or inert ingredient or adjuvant. Initially, these residues would necessarily be concentrated in the gastrointestinal tract and not uniformly distributed throughout the body. Over the longer term, the concentration in other body tissues will depend on the degree to which pesticide active or inert ingredient or adjuvant are absorbed from the gastrointestinal tract, the rate at which they are metabolized, and the rate at which they are excreted. The amounts of pesticide present in the gastrointestinal tract is generally higher than in other tissues because it will contain residues from the diet that might pass through unabsorbed. If the gastrointestinal tract is preferentially selected or avoided in larger prey, exposure estimates could be systematically over or underestimated.

The only terrestrial vertebrate model for calculating a BMF for chronic exposures of predators is for the simple food chain of soil → earthworm → shrew (Armitage and Gobas, 2007). The applicability of using the shrew BMF to other mammals and other terrestrial vertebrate groups is not known. Whether use of this model produces a systematic over or underestimation of exposure is not known.

No attempt was made to eliminate food items, particularly insect prey that might have died from exposure to the pesticide prior to being available for consumption. Since it was unlikely that dead prey would be consumed by predators or insectivores, failure to eliminate dead or moribund prey would have produced an overestimation of exposure.

Since this ERA is attempting to address potential future applications of pesticides, the proximity of application sites is not known. For species with large foraging areas, an AUF was used to account for the difference between the area where pesticide applications occur and the full area where a terrestrial species could forage. Should more than one application site occur within a species' foraging range, use of an AUF would underestimate potential exposure. In addition to presenting RQs based on an AUF, RQs estimated from exposure based on no AUF and a Mid-point AUF were also presented. Without knowing the distribution of application sites across a species foraging range, the appropriateness of any of these estimates of exposure cannot be known. By including the full range of possibilities from using an AUF to assuming the full foraging range could be treated, the complete range of exposures and the resulting RQs were presented.

7.1.5 Exposure of Birds and Mammals to Aquatic Prey

Osprey or southwestern river otter that typically forage in freshwater habitats larger than the waterbody modeled in PWC or the California brown pelican and southern sea otter that forage in marine/estuarine environments are among species likely to be exposed to prey from waters with lower concentrations than estimated by PWC.

7.2 Effects Assessment Uncertainties

7.2.1 Use of Surrogate Species Effects Data

Toxicity data were rarely available for the surrogate species considered in the risk assessment. Use of effects data from species other than the species of concern inherently added uncertainty to the assessment. When toxicity data for more than one species was available, the more sensitive species was selected. Data from species as closely related as possible were used. For example, when toxicity data from a passerine species was available, it was used for the passerine birds in the assessment.

Toxicity data were not always available for all taxonomic groups. This lack of data was most common for amphibians and reptiles. Bird or fish toxicity data were used when no data were available for terrestrial-phase amphibians and reptiles or aquatic-phase amphibians, respectively. It was not known when this approach might lead to an over or underestimation of risk.

7.2.2 Sublethal Effects

Sublethal effects were not specifically addressed, but when ecologically relevant sublethal toxicity endpoints were available on which to base TRVs, those results were preferentially selected.

7.2.3 Dermal or Inhalation Effects

In ERAs, it is standard practice to only address effects from oral exposure for terrestrial vertebrates. In general, focusing on effects from oral exposures is adequate (Suter, 2007: pp. 258-259). However, for terrestrial-phase amphibians, it is possible that dermal exposure to pesticide on surface soils might be readily absorbed and contribute to adverse effects in these species. Effects data for this pathway do not exist, so any effects from contact of terrestrial-phase amphibians to pesticides in soils are unknown. Also, inhalation exposure to airborne concentrations of pesticides can occur. Effects data from inhalation exposure are also lacking for wildlife species. The inability to include any potential risk derived from dermal or inhalation exposure will necessarily underestimate total risk, but since these routes are thought to generally be negligible, exclusion of exposure from these routes did not seriously affect the assessment of risk.

8 Conclusions

This ERA was conducted to determine the potential harm to ecological receptors from use of alternative foliar, soil drench, and soil injection applications for control of GWSS. The ERA was conducted using procedures and methodologies commonly used by government agencies such as USEPA as well as the risk assessment profession. The ERA relied upon the three-stage process for risk assessments: problem formulation, analysis, and risk characterization. In the problem formulation phase, CDFA and its risk assessment team consulted with DPR and OEHHA to determine the appropriate scenarios to assess, models to evaluate exposure, default data assumptions, and appropriate toxicity effects based on scientific literature. The problem formulation stage concluded with a CSM that identified the complete exposure pathways carried forward in the analysis based on information that was available to evaluate the potential exposure pathways. During the analysis phase of the ERA, detailed exposure was estimated with models incorporating appropriate data and conservative assumptions. Also in the analysis phase, effect values were developed which incorporated the toxicity properties of the pesticide active or inert ingredient or adjuvants along with safety factors to address uncertainty. The risk characterization phase provided conclusions on the potential for adverse effects to occur to ecological receptors. The risk characterization phase utilized both a quantitative and qualitative assessment. If the estimated RQ was below the LOC, then it was concluded that the potential for adverse effects is low. If the estimated RQ was above the LOC, then a qualitative assessment was conducted to incorporate information that the quantitative models are not capable of considering appropriately.

Section 5 lists the detailed results of the risk characterization phase for every species class. In some situations where the quantitative assessment indicated the RQ was below the LOC, it was easily concluded that the potential for adverse effects was low. When the RQ was above the LOC, several qualitative considerations typically result in a conclusion that the potential for

adverse effects would be low. As described in Section 5, the qualitative assessment considers the potential for species presence at an application site, incorporation of foraging range and diet, and fate and transport processes such as dilution and degradation.

In this ERA, few groups of ecological receptors were found to have RQs that exceed LOCs. These include insectivorous or omnivorous birds, mammals with aquatic or terrestrial diets, terrestrial insects, including pollinators, and aquatic invertebrates. CDFA's BMPs are designed to greatly reduce, if not eliminate, movement to surface water. Therefore actual impacts to aquatic invertebrates or birds and mammals that feed in aquatic habitats are anticipated to be minimal. Because of the targeted nature of the application to soil following drench or injection applications, only those insects that feed on treated host plant would be directly exposed. Most insects, such as flying insects, would receive no exposure following a soil application. Thus, most insects and insectivorous species are anticipated to be exposed to a limited extent during a soil application and impacts would be minimal. Exposure and the potential for impacts would be greater following a foliar application.

This ERA, along with the Statewide PEIR, will be used to assist CDFA in assessing the potential effects on particular species and developing site-specific measures to protect these species. This ERA did not identify new significant environmental effects or substantial increases in the severity of the significant effects identified in the PEIR accruing to the use of these scenarios in addition to previously analyzed treatment scenarios. No alterations to any of the scenarios assessed in this ERA that were not already indicated for other scenarios in the PEIR are recommended for the protection of biological resources.

9 Literature

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Appendix 3A

Appendix Eco-A. Estimated water concentrations using the Pesticide in Water Calculator.

Estimated water concentrations of active and inert ingredients following Application Scenario PDCP-64 with Safari 20 SG with No Foam B up to 150 times a year at a 2-day application interval using 0.22 lb. a.i./Acre to 3750 ft.^{2} on a nursery loading dock.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
Baseline- No Drift Buffer to Water or Habitat	Dinotefuran	3.86	1.98	3.81	1.98	3.81	1.98	3.79	25
Baseline- No Drift Buffer to Water or Habitat	Dodecylbenzene sulfonate	0.22	0.01	0.17	0.01	0.17	0.01	0.16	25
Baseline- No Drift Buffer to Water or Habitat	Ethanolamine	0.11	0.04	0.05	0.04	0.05	0.04	0.05	25
Baseline- No Drift Buffer to Water or Habitat	Isopropyl alcohol	0.17	0.03	0.15	0.03	0.15	0.03	0.15	25
Baseline- No Drift Buffer to Water or Habitat	POE Nonylphenol	3.60	3.19	3.52	3.18	3.52	3.18	3.50	25
Baseline- No Drift Buffer to Water or Habitat	Sodium dodecylbenzene sulfonate	0.09	0.00	0.07	0.00	0.07	0.00	0.06	25
Baseline- No Drift Buffer to Water or Habitat	Sodium xylene sulfonate	0.27	0.25	0.27	0.25	0.27	0.25	0.26	25

Appendix 3A

Estimated water concentrations of active and inert ingredients following Application Scenarios PDCP-65 of Safari 20 SG with No Foam B up to 2 times a year at a 90-day application interval using 0.22 lb. a.i./Acre to 0.75 acres in a nursery production area.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
Baseline- No Drift Buffer to Water or Habitat	Dinotefuran	0.16	0.06	0.14	0.06	0.14	0.06	0.11	25
Baseline- No Drift Buffer to Water or Habitat	Dodecylbenzene sulfonate	0.07	0.00	0.02	0.00	0.02	0.00	0.01	25
Baseline- No Drift Buffer to Water or Habitat	Ethanolamine	0.07	0.00	0.01	0.00	0.01	0.00	0.00	25
Baseline- No Drift Buffer to Water or Habitat	Isopropyl alcohol	0.03	0.00	0.01	0.00	0.01	0.00	0.01	25
Baseline- No Drift Buffer to Water or Habitat	POE Nonylphenol	0.20	0.07	0.12	0.07	0.12	0.07	0.08	25
Baseline- No Drift Buffer to Water or Habitat	Sodium dodecylbenzene sulfonate	0.03	0.00	0.01	0.00	0.01	0.00	0.00	25
Baseline- No Drift Buffer to Water or Habitat	Sodium xylene sulfonate	0.01	0.01	0.01	0.01	0.01	0.01	0.01	25
Reduced Exp.- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat	Dinotefuran	0.16	0.06	0.14	0.06	0.14	0.06	0.11	25
Reduced Exp.- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat	Dodecylbenzene sulfonate	0.07	0.00	0.02	0.00	0.02	0.00	0.01	25
Reduced Exp.- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat	Ethanolamine	0.07	0.00	0.01	0.00	0.01	0.00	0.00	25
Reduced Exp.- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat	Isopropyl alcohol	0.03	0.00	0.01	0.00	0.01	0.00	0.01	25
Reduced Exp.- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat	POE Nonylphenol	0.20	0.07	0.12	0.07	0.12	0.07	0.08	25
Reduced Exp.- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat	Sodium dodecylbenzene sulfonate	0.03	0.00	0.01	0.00	0.01	0.00	0.00	25
Reduced Exp.- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat	Sodium xylene sulfonate	0.01	0.01	0.01	0.01	0.01	0.01	0.01	25

Appendix 3A

Estimated water concentrations of active and inert ingredients following Application Scenarios PDCP-66 with Safari 20 SG once a year using 0.22 lb. a.i./Acre to 130 acres applied to the entire nursery using ground application equipment.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
Baseline- No Drift Buffer to Water or Habitat	Dinotefuran	7.99	2.49	7.02	2.47	7.02	2.47	5.52	25
Baseline- No Drift Buffer to Water or Habitat	Sodium dodecylbenzene sulfonate	1.54	0.0992	0.34	0.0304	0.34	0.0304	0.155	25
Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Dinotefuran	0	0	0	0	0	0	0	25
Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Sodium dodecylbenzene sulfonate	0	0	0	0	0	0	0	25

Estimated water concentrations of active and inert ingredients following Application Scenarios PDCP-66 Aerial with Safari 20 SG once a year using 0.22 lb. a.i./Acre to 130 acres applied to the entire nursery as an aerial application.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
Baseline- No Drift Buffer to Water or Habitat	Dinotefuran	8.16	2.54	7.17	2.52	7.17	2.52	5.64	25
Baseline- No Drift Buffer to Water or Habitat	Sodium dodecylbenzene sulfonate	1.51	0.0975	0.351	0.0291	0.351	0.0291	0.158	25
Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Dinotefuran	0	0	0	0	0	0	0	25
Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	Sodium dodecylbenzene sulfonate	0	0	0	0	0	0	0	25

Appendix 3A

Estimated water concentrations of active and inert ingredients following Application Scenarios PDCP-70 with Merit 2F as a foliar application once a year using 0.023 lb. a.i./Acre to 15 acres in an urban/residential setting.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
Baseline- No Drift Buffer to Water or Habitat	Glycerin	0.01	0.00	0.00	0.00	0.00	0.00	0.00	25
Baseline- No Drift Buffer to Water or Habitat	Imidacloprid	0.02	0.00	0.01	0.00	0.01	0.00	0.01	25

Estimated water concentrations of active and inert ingredients following Application Scenarios PDCP-71 with Merit 2F as a soil drench application once a year using 0.4 lb. a.i./Acre to 15 acres in an urban/residential setting.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
Baseline- Drench, 100% to Native Soil	Glycerin	0.07	0.00	0.01	0.00	0.01	0.00	0.00	25
Baseline- Drench, 100% to Native Soil	Imidacloprid	0.21	0.04	0.14	0.04	0.14	0.04	0.08	25

Appendix 3A

Estimated water concentrations of active and inert ingredients following Application Scenarios PDCP-77 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 150 time a year at a 2-day application interval using 0.027 lb. a.i./Acre to 3750 ft.^{2} on a nursery loading dock.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
Baseline- No Drift Buffer to Water or Habitat	Dodecylbenzene sulfonate	0.10	0.00	0.07	0.00	0.07	0.00	0.07	25
Baseline- No Drift Buffer to Water or Habitat	Ethanolamine	0.05	0.02	0.02	0.02	0.02	0.02	0.02	25
Baseline- No Drift Buffer to Water or Habitat	Glycerin	0.03	0.00	0.03	0.00	0.03	0.00	0.02	25
Baseline- No Drift Buffer to Water or Habitat	Imidacloprid	0.15	0.08	0.14	0.08	0.14	0.08	0.14	25
Baseline- No Drift Buffer to Water or Habitat	Isopropyl alcohol	0.08	0.01	0.07	0.01	0.07	0.01	0.07	25
Baseline- No Drift Buffer to Water or Habitat	POE Nonylphenol	1.65	1.46	1.62	1.46	1.62	1.46	1.61	25
Baseline- No Drift Buffer to Water or Habitat	Sodium xylene sulfonate	0.12	0.11	0.12	0.11	0.12	0.11	0.12	25

Appendix 3A

Estimated water concentrations of active and inert ingredients following Application Scenarios PDCP-78 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 2 times a year at a 180-day application interval using 0.027 lb. a.i./Acre to 0.75 acres in a nursery production area.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
Baseline- No Drift Buffer to Water or Habitat	Dodecylbenzene sulfonate	0.03	0.00	0.01	0.00	0.01	0.00	0.00	25
Baseline- No Drift Buffer to Water or Habitat	Ethanolamine	0.03	0.00	0.00	0.00	0.00	0.00	0.00	25
Baseline- No Drift Buffer to Water or Habitat	Glycerin	0.01	0.00	0.00	0.00	0.00	0.00	0.00	25
Baseline- No Drift Buffer to Water or Habitat	Imidacloprid	0.01	0.00	0.01	0.00	0.01	0.00	0.01	25
Baseline- No Drift Buffer to Water or Habitat	Isopropyl alcohol	0.01	0.00	0.01	0.00	0.01	0.00	0.00	25
Baseline- No Drift Buffer to Water or Habitat	POE Nonylphenol	0.08	0.02	0.05	0.02	0.05	0.02	0.04	25
Baseline- No Drift Buffer to Water or Habitat	Sodium xylene sulfonate	0.01	0.00	0.00	0.00	0.00	0.00	0.00	25

Appendix Eco-B. Estimated Environmental Concentrations.

Acute Estimated Environmental Concentrations of active and inert ingredients for the Baseline- No Drift Buffer to Water or Habitat EcoRisk Model Run for Application Scenario PDCP-64 with Safari 20 SG with No Foam B up to 150 times a year at a 2-day application interval using 0.22 lb. a.i./Acre to 3750 ft.^{2} on a nursery loading dock.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	5.94E-04	3.67E-04	3.51E-04	1.35E-04	8.29E-04	1.47E-04	6.48E-05
Pollen & Nectar (mg/bee)	7.05E-03	4.35E-03	4.16E-03	1.60E-03	9.83E-03	1.74E-03	7.69E-04
Terrestrial Insects (mg dw/kg)	1.38E+02	8.52E+01	8.15E+01	3.14E+01	1.93E+02	3.41E+01	1.51E+01
Terrestrial Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Invertebrates (mg dw/kg)	1.17E+01	1.81E+00	5.30E-01	5.10E-01	4.59E+03	7.24E-01	8.13E-01
Aquatic Insects (mg dw/kg)	2.22E+01	4.02E+00	1.13E+00	9.74E-01	1.11E+04	1.61E+00	1.54E+00
Aquatic Vegetation (mg dw/kg)	1.25E-02	7.57E-05	2.54E-04	1.07E-04	7.44E-01	3.05E-05	1.55E-03
Mixed Terrestrial Vegetation (mg dw/kg)	2.37E+02	1.47E+02	1.40E+02	5.40E+01	3.31E+02	5.86E+01	2.59E+01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.98E+02	1.22E+02	1.17E+02	4.51E+01	2.76E+02	4.90E+01	2.16E+01
Terrestrial Grass (mg dw/kg)	3.21E+02	1.98E+02	1.90E+02	7.30E+01	4.48E+02	7.93E+01	3.50E+01
Seeds (mg dw/kg)	3.66E+00	2.25E+00	2.15E+00	8.39E-01	5.10E+00	9.00E-01	4.00E-01
Fruit (mg dw/kg)	1.45E+01	8.87E+00	8.48E+00	3.31E+00	2.01E+01	3.55E+00	1.58E+00
Mammals (mg dw/kg)	1.05E+01	6.47E+00	6.18E+00	2.38E+00	1.46E+01	2.59E+00	1.14E+00
Birds (mg dw/kg)	6.04E+00	3.38E+00	3.14E+00	1.23E+00	3.74E+02	1.35E+00	6.28E-01
Reptiles (mg dw/kg)	7.35E-01	4.43E-01	4.20E-01	1.62E-01	1.58E+01	1.77E-01	7.93E-02
Amphibians (mg dw/kg)	6.24E-01	3.65E-01	3.44E-01	1.34E-01	2.00E+01	1.46E-01	6.63E-02
Fish (mg dw/kg)	1.14E+01	2.53E+00	3.36E-01	5.04E-01	7.97E+03	1.01E+00	8.98E-01
Acute Soils (mg dw/kg)	2.19E-02	1.35E-02	1.30E-02	4.98E-03	3.06E-02	5.42E-03	2.39E-03
Pollen & Nectar Larval (mg/bee)	7.04E-03	4.35E-03	4.16E-03	1.60E-03	9.83E-03	1.74E-03	7.68E-04

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Baseline- No Drift Buffer to Water or Habitat EcoRisk Model Run for Application Scenario PDCP-64 with Safari 20 SG with No Foam B up to 150 times a year at a 2-day application interval using 0.22 lb. a.i./Acre to 3750 $ft.^2$ on a nursery loading dock.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	7.05E-03	4.35E-03	4.16E-03	1.60E-03	9.83E-03	1.74E-03	7.69E-04
Terrestrial Insects (mg dw/kg)	1.38E+02	8.52E+01	8.15E+01	3.14E+01	1.93E+02	3.41E+01	1.51E+01
Terrestrial Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Invertebrates (mg dw/kg)	1.16E+01	1.37E+00	3.70E-01	4.67E-01	4.49E+03	5.48E-01	7.94E-01
Aquatic Insects (mg dw/kg)	2.20E+01	3.04E+00	8.28E-01	8.92E-01	1.09E+04	1.22E+00	1.50E+00
Aquatic Vegetation (mg dw/kg)	1.25E-02	6.81E-05	2.53E-04	1.06E-04	7.42E-01	2.73E-05	1.55E-03
Mixed Terrestrial Vegetation (mg dw/kg)	2.37E+02	1.47E+02	1.40E+02	5.40E+01	3.31E+02	5.86E+01	2.59E+01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.98E+02	1.22E+02	1.17E+02	4.51E+01	2.76E+02	4.90E+01	2.16E+01
Terrestrial Grass (mg dw/kg)	3.21E+02	1.98E+02	1.90E+02	7.30E+01	4.48E+02	7.93E+01	3.50E+01
Seeds (mg dw/kg)	3.66E+00	2.25E+00	2.15E+00	8.39E-01	5.10E+00	9.00E-01	4.00E-01
Fruit (mg dw/kg)	1.45E+01	8.87E+00	8.48E+00	3.31E+00	2.01E+01	3.55E+00	1.58E+00
Mammals (mg dw/kg)	2.07E+00	1.28E+00	1.22E+00	4.70E-01	1.73E+01	5.11E-01	2.25E-01
Birds (mg dw/kg)	5.96E-01	3.33E-01	3.12E-01	1.23E-01	1.91E+02	1.33E-01	6.22E-02
Reptiles (mg dw/kg)	2.74E+00	1.66E+00	1.58E+00	6.10E-01	3.40E+02	6.64E-01	2.97E-01
Amphibians (mg dw/kg)	4.57E+00	2.71E+00	2.57E+00	9.96E-01	6.47E+02	1.08E+00	4.89E-01
Fish (mg dw/kg)	1.12E+01	1.91E+00	1.72E-01	4.62E-01	7.80E+03	7.67E-01	8.76E-01
31-Day Soil TWA (mg dw/kg)	2.19E-02	1.35E-02	1.30E-02	4.98E-03	3.06E-02	5.42E-03	2.39E-03
56-Day Soil TWA (mg dw/kg)	1.13E+00	2.90E-01	1.34E-01	1.57E-02	6.68E-01	1.16E-01	1.39E-02
Pollen & Nectar Larval (mg/bee)	3.00E-03	1.86E-03	1.77E-03	6.83E-04	4.19E-03	7.42E-04	3.28E-04
365-Day Soil TWA (mg dw/kg)	8.19E-01	2.31E-01	1.10E-01	1.28E-02	5.32E-01	9.26E-02	1.14E-02

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Residue to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-64 with Safari 20 SG with No Foam B up to 150 times a year at a 2-day application interval using 0.22 lb. a.i./Acre to 3750 $ft.^2$ on a nursery loading dock.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	4.93E-06	3.05E-06	2.91E-06	1.12E-06	6.88E-06	1.22E-06	5.38E-07
Pollen & Nectar (mg/bee)	6.09E-04	2.11E-04	1.06E-04	1.78E-05	4.84E-04	8.46E-05	1.24E-05
Terrestrial Insects (mg dw/kg)	1.19E+01	4.14E+00	2.07E+00	3.49E-01	9.49E+00	1.66E+00	2.42E-01
Terrestrial Invertebrates (mg dw/kg)	1.36E-03	2.55E-02	4.31E-05	6.85E-05	4.98E+00	1.02E-02	1.62E-06
Aquatic Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	2.05E+01	7.12E+00	3.56E+00	5.98E-01	1.63E+01	2.85E+00	4.16E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.71E+01	5.95E+00	2.97E+00	5.00E-01	1.36E+01	2.38E+00	3.47E-01
Terrestrial Grass (mg dw/kg)	2.76E+01	9.64E+00	4.81E+00	8.08E-01	2.20E+01	3.85E+00	5.62E-01
Seeds (mg dw/kg)	3.25E-01	1.09E-01	5.46E-02	9.48E-03	2.54E-01	4.38E-02	6.53E-03
Fruit (mg dw/kg)	1.28E+00	4.32E-01	2.15E-01	3.74E-02	1.00E+00	1.73E-01	2.57E-02
Mammals (mg dw/kg)	9.05E-01	3.14E-01	1.57E-01	2.64E-02	7.19E-01	1.26E-01	1.84E-02
Birds (mg dw/kg)	4.54E-01	1.58E-01	7.87E-02	1.33E-02	3.68E-01	6.30E-02	9.21E-03
Reptiles (mg dw/kg)	6.13E-02	2.13E-02	1.06E-02	1.79E-03	4.87E-02	8.52E-03	1.24E-03
Amphibians (mg dw/kg)	5.01E-02	1.74E-02	8.69E-03	1.47E-03	4.19E-02	6.96E-03	1.02E-03
Fish (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acute Soils (mg dw/kg)	9.59E-03	2.44E-03	1.14E-03	1.41E-04	5.62E-03	9.76E-04	1.21E-04
Pollen & Nectar Larval (mg/bee)	2.60E-04	9.01E-05	4.50E-05	7.58E-06	2.06E-04	3.61E-05	5.26E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Residue to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-64 with Safari 20 SG with No Foam B up to 150 times a year at a 2-day application interval using 0.22 lb. a.i./Acre to 3750 $ft.^2$ on a nursery loading dock.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	5.94E-04	2.02E-04	9.64E-05	1.35E-05	4.64E-04	8.09E-05	1.05E-05
Terrestrial Insects (mg dw/kg)	1.16E+01	3.96E+00	1.89E+00	2.65E-01	9.08E+00	1.58E+00	2.06E-01
Terrestrial Invertebrates (mg dw/kg)	1.34E-03	2.52E-02	4.21E-05	6.32E-05	4.92E+00	1.01E-02	1.55E-06
Aquatic Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	2.00E+01	6.81E+00	3.25E+00	4.54E-01	1.56E+01	2.73E+00	3.54E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.67E+01	5.69E+00	2.71E+00	3.79E-01	1.30E+01	2.28E+00	2.96E-01
Terrestrial Grass (mg dw/kg)	2.70E+01	9.22E+00	4.39E+00	6.13E-01	2.11E+01	3.69E+00	4.79E-01
Seeds (mg dw/kg)	3.17E-01	1.05E-01	4.98E-02	7.24E-03	2.43E-01	4.19E-02	5.58E-03
Fruit (mg dw/kg)	1.25E+00	4.13E-01	1.97E-01	2.86E-02	9.58E-01	1.65E-01	2.20E-02
Mammals (mg dw/kg)	1.74E-01	5.93E-02	2.83E-02	3.96E-03	8.16E-01	2.37E-02	3.09E-03
Birds (mg dw/kg)	4.47E-02	1.51E-02	7.18E-03	1.02E-03	2.12E-01	6.03E-03	7.90E-04
Reptiles (mg dw/kg)	2.25E-01	7.67E-02	3.65E-02	5.11E-03	1.15E+00	3.07E-02	3.99E-03
Amphibians (mg dw/kg)	3.66E-01	1.25E-01	5.93E-02	8.32E-03	1.80E+00	4.98E-02	6.48E-03
Fish (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31-Day Soil TWA (mg dw/kg)	9.45E-03	2.41E-03	1.11E-03	1.30E-04	5.55E-03	9.65E-04	1.16E-04
56-Day Soil TWA (mg dw/kg)	9.36E-03	2.41E-03	1.11E-03	1.30E-04	5.55E-03	9.64E-04	1.16E-04
Pollen & Nectar Larval (mg/bee)	2.53E-04	8.62E-05	4.11E-05	5.76E-06	1.98E-04	3.45E-05	4.49E-06
365-Day Soil TWA (mg dw/kg)	6.79E-03	1.92E-03	9.10E-04	1.07E-04	4.42E-03	7.68E-04	9.47E-05

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients for the Baseline- No Drift Buffer to Water or Habitat EcoRisk Model Run for Application Scenario PDCP-65 of Safari 20 SG with No Foam B up to 2 times a year at a 90-day application interval using 0.22 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	5.94E-04	3.67E-04	3.51E-04	1.35E-04	8.29E-04	1.47E-04	6.48E-05
Pollen & Nectar (mg/bee)	7.12E-03	4.35E-03	4.16E-03	1.60E-03	9.83E-03	1.74E-03	7.69E-04
Terrestrial Insects (mg dw/kg)	1.40E+02	8.53E+01	8.15E+01	3.14E+01	1.93E+02	3.41E+01	1.51E+01
Terrestrial Invertebrates (mg dw/kg)	4.51E-03	1.59E-01	4.95E-04	2.42E-03	3.05E+01	6.35E-02	3.20E-05
Aquatic Invertebrates (mg dw/kg)	4.88E-01	5.65E-01	2.01E-01	7.75E-02	2.43E+02	2.27E-01	4.08E-02
Aquatic Insects (mg dw/kg)	9.25E-01	1.26E+00	3.86E-01	1.48E-01	5.87E+02	5.05E-01	7.65E-02
Aquatic Vegetation (mg dw/kg)	3.63E-04	1.74E-05	1.57E-05	7.53E-06	1.59E-02	7.00E-06	4.25E-05
Mixed Terrestrial Vegetation (mg dw/kg)	2.40E+02	1.47E+02	1.40E+02	5.40E+01	3.31E+02	5.86E+01	2.59E+01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	2.00E+02	1.22E+02	1.17E+02	4.51E+01	2.77E+02	4.90E+01	2.16E+01
Terrestrial Grass (mg dw/kg)	3.24E+02	1.98E+02	1.90E+02	7.30E+01	4.48E+02	7.94E+01	3.50E+01
Seeds (mg dw/kg)	3.71E+00	2.25E+00	2.15E+00	8.39E-01	5.10E+00	9.00E-01	4.00E-01
Fruit (mg dw/kg)	1.46E+01	8.88E+00	8.48E+00	3.31E+00	2.01E+01	3.55E+00	1.58E+00
Mammals (mg dw/kg)	1.06E+01	6.47E+00	6.18E+00	2.38E+00	1.46E+01	2.59E+00	1.14E+00
Birds (mg dw/kg)	5.34E+00	3.29E+00	3.11E+00	1.20E+00	2.68E+01	1.31E+00	5.76E-01
Reptiles (mg dw/kg)	7.18E-01	4.40E-01	4.19E-01	1.62E-01	1.78E+00	1.76E-01	7.75E-02
Amphibians (mg dw/kg)	5.88E-01	3.60E-01	3.43E-01	1.32E-01	1.84E+00	1.44E-01	6.34E-02
Fish (mg dw/kg)	4.75E-01	7.91E-01	1.95E-01	7.67E-02	4.26E+02	3.17E-01	4.64E-02
Acute Soils (mg dw/kg)	3.17E-02	1.52E-02	1.31E-02	4.98E-03	3.44E-02	6.07E-03	2.39E-03
Pollen & Nectar Larval (mg/bee)	3.04E-03	1.86E-03	1.77E-03	6.83E-04	4.19E-03	7.42E-04	3.28E-04

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Baseline- No Drift Buffer to Water or Habitat EcoRisk Model Run for Application Scenario PDCP-65 of Safari 20 SG with No Foam B up to 2 times a year at a 90-day application interval using 0.22 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	3.69E-03	1.48E-03	7.45E-04	1.04E-04	3.39E-03	5.94E-04	8.14E-05
Terrestrial Insects (mg dw/kg)	7.22E+01	2.91E+01	1.46E+01	2.04E+00	6.64E+01	1.16E+01	1.59E+00
Terrestrial Invertebrates (mg dw/kg)	3.95E-03	1.14E-01	2.59E-04	4.88E-04	2.20E+01	4.56E-02	1.13E-05
Aquatic Invertebrates (mg dw/kg)	4.32E-01	1.59E-01	2.78E-02	4.07E-02	1.55E+02	6.40E-02	3.39E-02
Aquatic Insects (mg dw/kg)	8.18E-01	3.54E-01	5.95E-02	7.78E-02	3.75E+02	1.42E-01	6.37E-02
Aquatic Vegetation (mg dw/kg)	3.60E-04	8.79E-06	1.40E-05	6.66E-06	1.58E-02	3.53E-06	4.21E-05
Mixed Terrestrial Vegetation (mg dw/kg)	1.24E+02	5.00E+01	2.51E+01	3.49E+00	1.14E+02	2.00E+01	2.74E+00
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.04E+02	4.18E+01	2.10E+01	2.92E+00	9.53E+01	1.67E+01	2.29E+00
Terrestrial Grass (mg dw/kg)	1.68E+02	6.76E+01	3.40E+01	4.71E+00	1.54E+02	2.71E+01	3.70E+00
Seeds (mg dw/kg)	1.93E+00	7.68E-01	3.85E-01	5.57E-02	1.77E+00	3.07E-01	4.30E-02
Fruit (mg dw/kg)	7.63E+00	3.03E+00	1.52E+00	2.20E-01	6.97E+00	1.21E+00	1.70E-01
Mammals (mg dw/kg)	1.08E+00	4.35E-01	2.19E-01	3.05E-02	5.97E+00	1.74E-01	2.39E-02
Birds (mg dw/kg)	2.78E-01	1.12E-01	5.57E-02	8.06E-03	7.99E+00	4.47E-02	6.30E-03
Reptiles (mg dw/kg)	1.40E+00	5.64E-01	2.83E-01	3.96E-02	1.93E+01	2.26E-01	3.10E-02
Amphibians (mg dw/kg)	2.28E+00	9.17E-01	4.59E-01	6.48E-02	3.40E+01	3.67E-01	5.08E-02
Fish (mg dw/kg)	4.20E-01	2.23E-01	1.70E-02	4.03E-02	2.71E+02	8.95E-02	3.83E-02
31-Day Soil TWA (mg dw/kg)	2.79E-02	1.09E-02	6.87E-03	1.01E-03	2.49E-02	4.36E-03	8.43E-04
56-Day Soil TWA (mg dw/kg)	2.51E-02	8.53E-03	4.54E-03	5.59E-04	1.95E-02	3.41E-03	4.94E-04
Pollen & Nectar Larval (mg/bee)	1.57E-03	6.33E-04	3.18E-04	4.43E-05	1.45E-03	2.53E-04	3.47E-05
365-Day Soil TWA (mg dw/kg)	1.27E-02	3.18E-03	1.47E-03	1.71E-04	7.31E-03	1.27E-03	1.52E-04

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-65 of Safari 20 SG with No Foam B up to 2 times a year at a 90-day application interval using 0.22 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	4.93E-06	3.05E-06	2.91E-06	1.12E-06	6.88E-06	1.22E-06	5.38E-07
Pollen & Nectar (mg/bee)	5.91E-05	3.61E-05	3.45E-05	1.33E-05	8.16E-05	1.45E-05	6.38E-06
Terrestrial Insects (mg dw/kg)	1.16E+00	7.08E-01	6.76E-01	2.61E-01	1.60E+00	2.83E-01	1.25E-01
Terrestrial Invertebrates (mg dw/kg)	3.74E-05	1.32E-03	4.11E-06	2.01E-05	2.53E-01	5.27E-04	2.66E-07
Aquatic Invertebrates (mg dw/kg)	4.88E-01	5.65E-01	2.01E-01	7.75E-02	2.43E+02	2.27E-01	4.08E-02
Aquatic Insects (mg dw/kg)	9.25E-01	1.26E+00	3.86E-01	1.48E-01	5.87E+02	5.05E-01	7.65E-02
Aquatic Vegetation (mg dw/kg)	3.63E-04	1.74E-05	1.57E-05	7.53E-06	1.59E-02	7.00E-06	4.25E-05
Mixed Terrestrial Vegetation (mg dw/kg)	1.99E+00	1.22E+00	1.16E+00	4.48E-01	2.75E+00	4.87E-01	2.15E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.66E+00	1.02E+00	9.71E-01	3.74E-01	2.30E+00	4.06E-01	1.79E-01
Terrestrial Grass (mg dw/kg)	2.69E+00	1.65E+00	1.57E+00	6.06E-01	3.72E+00	6.59E-01	2.91E-01
Seeds (mg dw/kg)	3.08E-02	1.87E-02	1.78E-02	6.96E-03	4.23E-02	7.47E-03	3.32E-03
Fruit (mg dw/kg)	1.22E-01	7.37E-02	7.04E-02	2.74E-02	1.67E-01	2.95E-02	1.31E-02
Mammals (mg dw/kg)	8.79E-02	5.37E-02	5.13E-02	1.98E-02	1.21E-01	2.15E-02	9.48E-03
Birds (mg dw/kg)	7.70E-02	6.95E-02	3.94E-02	1.52E-02	1.95E+01	2.78E-02	7.49E-03
Reptiles (mg dw/kg)	7.03E-03	5.21E-03	3.92E-03	1.51E-03	7.95E-01	2.08E-03	7.41E-04
Amphibians (mg dw/kg)	6.70E-03	5.25E-03	3.60E-03	1.39E-03	1.02E+00	2.10E-03	6.78E-04
Fish (mg dw/kg)	4.75E-01	7.91E-01	1.95E-01	7.67E-02	4.26E+02	3.17E-01	4.64E-02
Acute Soils (mg dw/kg)	2.64E-04	1.26E-04	1.09E-04	4.13E-05	2.86E-04	5.04E-05	1.99E-05
Pollen & Nectar Larval (mg/bee)	2.52E-05	1.54E-05	1.47E-05	5.67E-06	3.48E-05	6.16E-06	2.72E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Drift Buffer to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-65 of Safari 20 SG with No Foam B up to 2 times a year at a 90-day application interval using 0.22 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	3.06E-05	1.23E-05	6.19E-06	8.62E-07	2.81E-05	4.93E-06	6.75E-07
Terrestrial Insects (mg dw/kg)	5.99E-01	2.41E-01	1.21E-01	1.69E-02	5.51E-01	9.65E-02	1.32E-02
Terrestrial Invertebrates (mg dw/kg)	3.28E-05	9.46E-04	2.15E-06	4.05E-06	1.83E-01	3.78E-04	9.36E-08
Aquatic Invertebrates (mg dw/kg)	4.32E-01	1.59E-01	2.78E-02	4.07E-02	1.55E+02	6.40E-02	3.39E-02
Aquatic Insects (mg dw/kg)	8.18E-01	3.54E-01	5.95E-02	7.78E-02	3.75E+02	1.42E-01	6.37E-02
Aquatic Vegetation (mg dw/kg)	3.60E-04	8.79E-06	1.40E-05	6.66E-06	1.58E-02	3.53E-06	4.21E-05
Mixed Terrestrial Vegetation (mg dw/kg)	1.03E+00	4.15E-01	2.08E-01	2.90E-02	9.47E-01	1.66E-01	2.27E-02
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	8.60E-01	3.47E-01	1.74E-01	2.42E-02	7.91E-01	1.39E-01	1.90E-02
Terrestrial Grass (mg dw/kg)	1.39E+00	5.61E-01	2.82E-01	3.91E-02	1.28E+00	2.25E-01	3.07E-02
Seeds (mg dw/kg)	1.61E-02	6.37E-03	3.20E-03	4.62E-04	1.47E-02	2.55E-03	3.57E-04
Fruit (mg dw/kg)	6.33E-02	2.51E-02	1.26E-02	1.82E-03	5.78E-02	1.01E-02	1.41E-03
Mammals (mg dw/kg)	8.97E-03	3.61E-03	1.81E-03	2.53E-04	4.95E-02	1.45E-03	1.98E-04
Birds (mg dw/kg)	4.90E-03	1.97E-03	6.40E-04	3.12E-04	6.46E+00	7.90E-04	2.55E-04
Reptiles (mg dw/kg)	1.42E-02	6.03E-03	2.45E-03	5.75E-04	1.10E+01	2.41E-03	4.90E-04
Amphibians (mg dw/kg)	2.76E-02	1.11E-02	4.40E-03	1.36E-03	2.12E+01	4.43E-03	1.10E-03
Fish (mg dw/kg)	4.20E-01	2.23E-01	1.70E-02	4.03E-02	2.71E+02	8.95E-02	3.83E-02
31-Day Soil TWA (mg dw/kg)	2.31E-04	9.04E-05	5.70E-05	8.35E-06	2.06E-04	3.62E-05	7.00E-06
56-Day Soil TWA (mg dw/kg)	2.08E-04	7.08E-05	3.77E-05	4.64E-06	1.62E-04	2.83E-05	4.10E-06
Pollen & Nectar Larval (mg/bee)	1.30E-05	5.25E-06	2.64E-06	3.67E-07	1.20E-05	2.10E-06	2.88E-07
365-Day Soil TWA (mg dw/kg)	1.05E-04	2.64E-05	1.22E-05	1.42E-06	6.07E-05	1.05E-05	1.26E-06

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Residue to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-65 of Safari 20 SG with No Foam B up to 2 times a year at a 90-day application interval using 0.22 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	4.93E-06	3.05E-06	2.91E-06	1.12E-06	6.88E-06	1.22E-06	5.38E-07
Pollen & Nectar (mg/bee)	5.91E-05	3.61E-05	3.45E-05	1.33E-05	8.16E-05	1.45E-05	6.38E-06
Terrestrial Insects (mg dw/kg)	1.16E+00	7.08E-01	6.76E-01	2.61E-01	1.60E+00	2.83E-01	1.25E-01
Terrestrial Invertebrates (mg dw/kg)	3.74E-05	1.32E-03	4.11E-06	2.01E-05	2.53E-01	5.27E-04	2.66E-07
Aquatic Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	1.99E+00	1.22E+00	1.16E+00	4.48E-01	2.75E+00	4.87E-01	2.15E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.66E+00	1.02E+00	9.71E-01	3.74E-01	2.30E+00	4.06E-01	1.79E-01
Terrestrial Grass (mg dw/kg)	2.69E+00	1.65E+00	1.57E+00	6.06E-01	3.72E+00	6.59E-01	2.91E-01
Seeds (mg dw/kg)	3.08E-02	1.87E-02	1.78E-02	6.96E-03	4.23E-02	7.47E-03	3.32E-03
Fruit (mg dw/kg)	1.22E-01	7.37E-02	7.04E-02	2.74E-02	1.67E-01	2.95E-02	1.31E-02
Mammals (mg dw/kg)	8.79E-02	5.37E-02	5.13E-02	1.98E-02	1.21E-01	2.15E-02	9.48E-03
Birds (mg dw/kg)	4.41E-02	2.69E-02	2.57E-02	9.92E-03	6.12E-02	1.08E-02	4.76E-03
Reptiles (mg dw/kg)	5.95E-03	3.64E-03	3.48E-03	1.34E-03	8.22E-03	1.45E-03	6.42E-04
Amphibians (mg dw/kg)	4.86E-03	2.97E-03	2.84E-03	1.09E-03	6.82E-03	1.19E-03	5.25E-04
Fish (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acute Soils (mg dw/kg)	2.64E-04	1.26E-04	1.09E-04	4.13E-05	2.86E-04	5.04E-05	1.99E-05
Pollen & Nectar Larval (mg/bee)	2.52E-05	1.54E-05	1.47E-05	5.67E-06	3.48E-05	6.16E-06	2.72E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Residue to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-65 of Safari 20 SG with No Foam B up to 2 times a year at a 90-day application interval using 0.22 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dinotefuran	Dodecylbenzene sulfonate	Ethanolamine	Isopropyl alcohol	POE Nonylphenol	Sodium dodecylbenzene sulfonate	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	3.06E-05	1.23E-05	6.19E-06	8.62E-07	2.81E-05	4.93E-06	6.75E-07
Terrestrial Insects (mg dw/kg)	5.99E-01	2.41E-01	1.21E-01	1.69E-02	5.51E-01	9.65E-02	1.32E-02
Terrestrial Invertebrates (mg dw/kg)	3.28E-05	9.46E-04	2.15E-06	4.05E-06	1.83E-01	3.78E-04	9.36E-08
Aquatic Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	1.03E+00	4.15E-01	2.08E-01	2.90E-02	9.47E-01	1.66E-01	2.27E-02
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	8.60E-01	3.47E-01	1.74E-01	2.42E-02	7.91E-01	1.39E-01	1.90E-02
Terrestrial Grass (mg dw/kg)	1.39E+00	5.61E-01	2.82E-01	3.91E-02	1.28E+00	2.25E-01	3.07E-02
Seeds (mg dw/kg)	1.61E-02	6.37E-03	3.20E-03	4.62E-04	1.47E-02	2.55E-03	3.57E-04
Fruit (mg dw/kg)	6.33E-02	2.51E-02	1.26E-02	1.82E-03	5.78E-02	1.01E-02	1.41E-03
Mammals (mg dw/kg)	8.97E-03	3.61E-03	1.81E-03	2.53E-04	4.95E-02	1.45E-03	1.98E-04
Birds (mg dw/kg)	2.29E-03	9.18E-04	4.61E-04	6.49E-05	1.28E-02	3.67E-04	5.06E-05
Reptiles (mg dw/kg)	1.16E-02	4.67E-03	2.34E-03	3.26E-04	6.95E-02	1.87E-03	2.56E-04
Amphibians (mg dw/kg)	1.88E-02	7.58E-03	3.81E-03	5.31E-04	1.07E-01	3.03E-03	4.16E-04
Fish (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31-Day Soil TWA (mg dw/kg)	2.31E-04	9.04E-05	5.70E-05	8.35E-06	2.06E-04	3.62E-05	7.00E-06
56-Day Soil TWA (mg dw/kg)	2.08E-04	7.08E-05	3.77E-05	4.64E-06	1.62E-04	2.83E-05	4.10E-06
Pollen & Nectar Larval (mg/bee)	1.30E-05	5.25E-06	2.64E-06	3.67E-07	1.20E-05	2.10E-06	2.88E-07
365-Day Soil TWA (mg dw/kg)	1.05E-04	2.64E-05	1.22E-05	1.42E-06	6.07E-05	1.05E-05	1.26E-06

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients following Application Scenarios PDCP-66 with Safari 20 SG once a year using 0.22 lb. a.i./Acre to 130 acres applied to the entire nursery using ground application equipment.

	Baseline- No Drift Buffer to Water or Habitat		Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	
	Dinotefuran	Sodium dodecylbenzene sulfonate	Dinotefuran	Sodium dodecylbenzene sulfonate
Bee (Contact) (mg/bee)	5.94E-04	1.47E-04	4.93E-06	1.22E-06
Pollen & Nectar (mg/bee)	7.05E-03	1.74E-03	5.85E-05	1.44E-05
Terrestrial Insects (mg dw/kg)	1.38E+02	3.41E+01	1.15E+00	2.83E-01
Terrestrial Invertebrates (mg dw/kg)	3.11E-03	5.67E-02	2.58E-05	4.70E-04
Aquatic Invertebrates (mg dw/kg)	2.40E+01	1.28E+01	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	4.55E+01	2.84E+01	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	1.58E-02	7.15E-04	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	2.37E+02	5.86E+01	1.97E+00	4.87E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.98E+02	4.90E+01	1.64E+00	4.06E-01
Terrestrial Grass (mg dw/kg)	3.21E+02	7.93E+01	2.66E+00	6.58E-01
Seeds (mg dw/kg)	3.66E+00	9.00E-01	3.04E-02	7.47E-03
Fruit (mg dw/kg)	1.45E+01	3.55E+00	1.20E-01	2.95E-02
Mammals (mg dw/kg)	1.05E+01	2.59E+00	8.69E-02	2.15E-02
Birds (mg dw/kg)	6.87E+00	2.26E+00	4.36E-02	1.08E-02
Reptiles (mg dw/kg)	7.62E-01	2.11E-01	5.89E-03	1.45E-03
Amphibians (mg dw/kg)	6.70E-01	1.95E-01	4.81E-03	1.19E-03
Fish (mg dw/kg)	2.34E+01	1.79E+01	0.00E+00	0.00E+00
Acute Soils (mg dw/kg)	2.19E-02	5.42E-03	1.82E-04	4.50E-05
Pollen & Nectar Larval (mg/bee)	3.00E-03	7.42E-04	2.49E-05	6.16E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients following Application Scenarios PDCP-66 with Safari 20 SG once a year using 0.22 lb. a.i./Acre to 130 acres applied to the entire nursery using ground application equipment.

	Baseline- No Drift Buffer to Water or Habitat		Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	
	Dinotefuran	Sodium dodecylbenzene sulfonate	Dinotefuran	Sodium dodecylbenzene sulfonate
Pollen & Nectar (mg/bee)	3.47E-03	5.41E-04	2.88E-05	4.49E-06
Terrestrial Insects (mg dw/kg)	6.79E+01	1.06E+01	5.63E-01	8.79E-02
Terrestrial Invertebrates (mg dw/kg)	2.73E-03	4.07E-02	2.27E-05	3.38E-04
Aquatic Invertebrates (mg dw/kg)	2.12E+01	2.82E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	4.01E+01	6.28E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	1.56E-02	2.19E-04	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	1.17E+02	1.82E+01	9.68E-01	1.51E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	9.74E+01	1.52E+01	8.09E-01	1.26E-01
Terrestrial Grass (mg dw/kg)	1.58E+02	2.46E+01	1.31E+00	2.04E-01
Seeds (mg dw/kg)	1.81E+00	2.80E-01	1.50E-02	2.32E-03
Fruit (mg dw/kg)	7.14E+00	1.10E+00	5.93E-02	9.15E-03
Mammals (mg dw/kg)	1.02E+00	1.59E-01	8.43E-03	1.32E-03
Birds (mg dw/kg)	3.87E-01	5.89E-02	2.15E-03	3.34E-04
Reptiles (mg dw/kg)	1.44E+00	2.29E-01	1.09E-02	1.70E-03
Amphibians (mg dw/kg)	2.56E+00	3.94E-01	1.77E-02	2.76E-03
Fish (mg dw/kg)	2.06E+01	3.95E+00	0.00E+00	0.00E+00
31-Day Soil TWA (mg dw/kg)	1.92E-02	3.89E-03	1.60E-04	3.23E-05
56-Day Soil TWA (mg dw/kg)	1.73E-02	3.04E-03	1.44E-04	2.53E-05
Pollen & Nectar Larval (mg/bee)	1.48E-03	2.30E-04	1.23E-05	1.91E-06
365-Day Soil TWA (mg dw/kg)	6.49E-03	6.36E-04	5.39E-05	5.28E-06

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients following Application Scenarios PDCP-66 Aerial with Safari 20 SG once a year using 0.22 lb. a.i./Acre to 130 acres applied to the entire nursery using ground application equipment.

	Baseline- No Drift Buffer to Water or Habitat		Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	
	Dinotefuran	Sodium dodecylbenzene sulfonate	Dinotefuran	Sodium dodecylbenzene sulfonate
Bee (Contact) (mg/bee)	5.94E-04	1.47E-04	4.93E-06	1.22E-06
Pollen & Nectar (mg/bee)	7.05E-03	1.74E-03	5.85E-05	1.44E-05
Terrestrial Insects (mg dw/kg)	1.38E+02	3.41E+01	1.15E+00	2.83E-01
Terrestrial Invertebrates (mg dw/kg)	3.11E-03	5.67E-02	2.58E-05	4.70E-04
Aquatic Invertebrates (mg dw/kg)	2.45E+01	1.25E+01	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	4.65E+01	2.79E+01	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	1.61E-02	7.03E-04	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	2.37E+02	5.86E+01	1.97E+00	4.87E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.98E+02	4.90E+01	1.64E+00	4.06E-01
Terrestrial Grass (mg dw/kg)	3.21E+02	7.93E+01	2.66E+00	6.58E-01
Seeds (mg dw/kg)	3.66E+00	9.00E-01	3.04E-02	7.47E-03
Fruit (mg dw/kg)	1.45E+01	3.55E+00	1.20E-01	2.95E-02
Mammals (mg dw/kg)	1.05E+01	2.59E+00	8.69E-02	2.15E-02
Birds (mg dw/kg)	6.90E+00	2.24E+00	4.36E-02	1.08E-02
Reptiles (mg dw/kg)	7.64E-01	2.10E-01	5.89E-03	1.45E-03
Amphibians (mg dw/kg)	6.72E-01	1.94E-01	4.81E-03	1.19E-03
Fish (mg dw/kg)	2.39E+01	1.75E+01	0.00E+00	0.00E+00
Acute Soils (mg dw/kg)	2.19E-02	5.42E-03	1.82E-04	4.50E-05
Pollen & Nectar Larval (mg/bee)	3.00E-03	7.42E-04	2.49E-05	6.16E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients following Application Scenarios PDCP-66 Aerial with Safari 20 SG once a year using 0.22 lb. a.i./Acre to 130 acres applied to the entire nursery using ground application equipment.

	Baseline- No Drift Buffer to Water or Habitat		Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	
	Dinotefuran	Sodium dodecylbenzene sulfonate	Dinotefuran	Sodium dodecylbenzene sulfonate
Pollen & Nectar (mg/bee)	3.47E-03	5.41E-04	2.88E-05	4.49E-06
Terrestrial Insects (mg dw/kg)	6.79E+01	1.06E+01	5.63E-01	8.79E-02
Terrestrial Invertebrates (mg dw/kg)	2.73E-03	4.07E-02	2.27E-05	3.38E-04
Aquatic Invertebrates (mg dw/kg)	2.16E+01	2.91E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	4.09E+01	6.48E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	1.59E-02	2.10E-04	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	1.17E+02	1.82E+01	9.68E-01	1.51E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	9.74E+01	1.52E+01	8.09E-01	1.26E-01
Terrestrial Grass (mg dw/kg)	1.58E+02	2.46E+01	1.31E+00	2.04E-01
Seeds (mg dw/kg)	1.81E+00	2.80E-01	1.50E-02	2.32E-03
Fruit (mg dw/kg)	7.14E+00	1.10E+00	5.93E-02	9.15E-03
Mammals (mg dw/kg)	1.02E+00	1.59E-01	8.43E-03	1.32E-03
Birds (mg dw/kg)	3.90E-01	5.95E-02	2.15E-03	3.34E-04
Reptiles (mg dw/kg)	1.44E+00	2.30E-01	1.09E-02	1.70E-03
Amphibians (mg dw/kg)	2.57E+00	3.96E-01	1.77E-02	2.76E-03
Fish (mg dw/kg)	2.10E+01	4.07E+00	0.00E+00	0.00E+00
31-Day Soil TWA (mg dw/kg)	1.92E-02	3.89E-03	1.60E-04	3.23E-05
56-Day Soil TWA (mg dw/kg)	1.73E-02	3.04E-03	1.44E-04	2.53E-05
Pollen & Nectar Larval (mg/bee)	1.48E-03	2.30E-04	1.23E-05	1.91E-06
365-Day Soil TWA (mg dw/kg)	6.49E-03	6.36E-04	5.39E-05	5.28E-06

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients following Application Scenarios PDCP-70 with Merit 2F as a foliar application once a year using 0.023 lb. a.i./Acre to 15 acres in an urban/residential setting.

	Baseline- No Drift Buffer to Water or Habitat		Reduced Exp.- No Residue to Water		Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	
	Glycerin	Imidacloprid	Glycerin	Imidacloprid	Glycerin	Imidacloprid
Bee (Contact) (mg/bee)	2.97E-05	6.21E-05	2.97E-05	6.21E-05	2.47E-07	5.15E-07
Pollen & Nectar (mg/bee)	3.53E-04	7.36E-04	3.53E-04	7.36E-04	2.93E-06	6.11E-06
Terrestrial Insects (mg dw/kg)	6.92E+00	1.44E+01	6.92E+00	1.44E+01	5.74E-02	1.20E-01
Terrestrial Invertebrates (mg dw/kg)	1.77E-05	2.99E-03	1.77E-05	2.99E-03	1.47E-07	2.48E-05
Aquatic Invertebrates (mg dw/kg)	2.19E-02	6.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	4.07E-02	1.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	1.31E-06	1.67E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	1.19E+01	2.48E+01	1.19E+01	2.48E+01	9.86E-02	2.06E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	9.92E+00	2.07E+01	9.92E+00	2.07E+01	8.24E-02	1.72E-01
Terrestrial Grass (mg dw/kg)	1.61E+01	3.35E+01	1.61E+01	3.35E+01	1.33E-01	2.78E-01
Seeds (mg dw/kg)	1.86E-01	3.81E-01	1.86E-01	3.81E-01	1.54E-03	3.16E-03
Fruit (mg dw/kg)	7.33E-01	1.50E+00	7.33E-01	1.50E+00	6.08E-03	1.25E-02
Mammals (mg dw/kg)	5.25E-01	1.09E+00	5.25E-01	1.09E+00	4.35E-03	9.08E-03
Birds (mg dw/kg)	2.65E-01	5.53E-01	2.63E-01	5.48E-01	2.19E-03	4.55E-03
Reptiles (mg dw/kg)	3.56E-02	7.42E-02	3.55E-02	7.41E-02	2.95E-04	6.15E-04
Amphibians (mg dw/kg)	2.91E-02	6.08E-02	2.91E-02	6.06E-02	2.41E-04	5.03E-04
Fish (mg dw/kg)	2.49E-02	6.72E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acute Soils (mg dw/kg)	1.10E-03	2.29E-03	1.10E-03	2.29E-03	9.10E-06	1.90E-05
Pollen & Nectar Larval (mg/bee)	1.50E-04	3.14E-04	1.50E-04	3.14E-04	1.25E-06	2.60E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients following Application Scenarios PDCP-70 with Merit 2F as a foliar application once a year using 0.023 lb. a.i./Acre to 15 acres in an urban/residential setting.

	Baseline- No Drift Buffer to Water or Habitat		Reduced Exp.- No Residue to Water		Reduced Exp.- No Residue to Water, 25-ft. Drift Buffer to Habitat	
	Glycerin	Imidacloprid	Glycerin	Imidacloprid	Glycerin	Imidacloprid
Pollen & Nectar (mg/bee)	5.80E-06	1.31E-04	5.80E-06	1.31E-04	4.82E-08	1.09E-06
Terrestrial Insects (mg dw/kg)	1.14E-01	2.57E+00	1.14E-01	2.57E+00	9.47E-04	2.13E-02
Terrestrial Invertebrates (mg dw/kg)	2.36E-06	2.62E-03	2.36E-06	2.62E-03	1.96E-08	2.18E-05
Aquatic Invertebrates (mg dw/kg)	3.73E-03	4.27E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	6.93E-03	8.34E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	6.62E-07	1.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	1.94E-01	4.42E+00	1.94E-01	4.42E+00	1.61E-03	3.67E-02
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.62E-01	3.69E+00	1.62E-01	3.69E+00	1.35E-03	3.06E-02
Terrestrial Grass (mg dw/kg)	2.60E-01	5.98E+00	2.60E-01	5.98E+00	2.16E-03	4.96E-02
Seeds (mg dw/kg)	3.45E-03	6.80E-02	3.45E-03	6.80E-02	2.86E-05	5.64E-04
Fruit (mg dw/kg)	1.36E-02	2.68E-01	1.36E-02	2.68E-01	1.13E-04	2.23E-03
Mammals (mg dw/kg)	1.70E-03	3.85E-02	1.70E-03	3.85E-02	1.41E-05	3.19E-04
Birds (mg dw/kg)	4.72E-04	1.00E-02	4.50E-04	9.78E-03	3.73E-06	8.12E-05
Reptiles (mg dw/kg)	2.22E-03	5.00E-02	2.19E-03	4.97E-02	1.82E-05	4.13E-04
Amphibians (mg dw/kg)	3.66E-03	8.16E-02	3.58E-03	8.07E-02	2.97E-05	6.70E-04
Fish (mg dw/kg)	4.24E-03	4.44E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31-Day Soil TWA (mg dw/kg)	5.80E-06	1.31E-04	5.80E-06	1.31E-04	4.82E-08	1.09E-06
56-Day Soil TWA (mg dw/kg)	1.14E-01	2.57E+00	1.14E-01	2.57E+00	9.47E-04	2.13E-02
Pollen & Nectar Larval (mg/bee)	2.36E-06	2.62E-03	2.36E-06	2.62E-03	1.96E-08	2.18E-05
365-Day Soil TWA (mg dw/kg)	3.73E-03	4.27E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients following Application Scenarios PDCP-71 with Merit 2F as a soil drench application once a year using 0.4 lb. a.i./Acre to 15 acres in an urban/residential setting.

	Baseline- Drench, 100% to Native Soil		Reduced Exp.- No Residue to Water	
	Glycerin	Imidacloprid	Glycerin	Imidacloprid
Bee (Contact) (mg/bee)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pollen & Nectar (mg/bee)	8.93E-05	5.95E-06	8.93E-05	5.95E-06
Terrestrial Insects (mg dw/kg)	2.04E+00	1.36E-01	2.04E+00	1.36E-01
Terrestrial Invertebrates (mg dw/kg)	1.53E-03	2.60E-01	1.53E-03	2.60E-01
Aquatic Invertebrates (mg dw/kg)	1.79E-01	7.03E-01	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	3.32E-01	1.37E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	1.07E-05	1.76E-04	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	2.72E-01	1.19E-01	2.72E-01	1.19E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	2.04E+00	1.36E-01	2.04E+00	1.36E-01
Terrestrial Grass (mg dw/kg)	2.55E+00	1.70E-01	2.55E+00	1.70E-01
Seeds (mg dw/kg)	3.37E-01	2.25E-02	3.37E-01	2.25E-02
Fruit (mg dw/kg)	1.33E+00	8.85E-02	1.33E+00	8.85E-02
Mammals (mg dw/kg)	8.32E-02	8.59E-03	8.32E-02	8.56E-03
Birds (mg dw/kg)	1.06E-01	5.65E-02	9.42E-02	8.13E-03
Reptiles (mg dw/kg)	9.69E-03	2.28E-03	9.25E-03	6.63E-04
Amphibians (mg dw/kg)	9.25E-03	3.38E-03	8.58E-03	7.11E-04
Fish (mg dw/kg)	2.03E-01	7.32E-01	0.00E+00	0.00E+00
Acute Soils (mg dw/kg)	9.46E-02	1.99E-01	9.46E-02	1.99E-01
Pollen & Nectar Larval (mg/bee)	3.79E-05	2.53E-06	3.79E-05	2.53E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients following Application Scenarios PDCP-71 with Merit 2F as a soil drench application once a year using 0.4 lb. a.i./Acre to 15 acres in an urban/residential setting.

	Baseline- Drench, 100% to Native Soil		Reduced Exp.- No Residue to Water	
	Glycerin	Imidacloprid	Glycerin	Imidacloprid
Pollen & Nectar (mg/bee)	1.19E-05	5.22E-06	1.19E-05	5.22E-06
Terrestrial Insects (mg dw/kg)	2.72E-01	1.19E-01	2.72E-01	1.19E-01
Terrestrial Invertebrates (mg dw/kg)	2.04E-04	2.28E-01	2.04E-04	2.28E-01
Aquatic Invertebrates (mg dw/kg)	3.02E-02	4.67E-01	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	5.62E-02	9.14E-01	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	5.38E-06	1.73E-04	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	2.72E-01	1.19E-01	2.72E-01	1.19E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	2.72E-01	1.19E-01	2.72E-01	1.19E-01
Terrestrial Grass (mg dw/kg)	3.40E-01	1.49E-01	3.40E-01	1.49E-01
Seeds (mg dw/kg)	4.49E-02	1.97E-02	4.49E-02	1.97E-02
Fruit (mg dw/kg)	1.77E-01	7.77E-02	1.77E-01	7.77E-02
Mammals (mg dw/kg)	3.53E-03	1.59E-03	3.53E-03	1.59E-03
Birds (mg dw/kg)	2.58E-03	4.07E-03	2.39E-03	1.19E-03
Reptiles (mg dw/kg)	4.45E-03	4.87E-03	4.24E-03	1.87E-03
Amphibians (mg dw/kg)	9.15E-03	1.41E-02	8.54E-03	4.43E-03
Fish (mg dw/kg)	3.43E-02	4.86E-01	0.00E+00	0.00E+00
31-Day Soil TWA (mg dw/kg)	1.26E-02	1.75E-01	1.26E-02	1.75E-01
56-Day Soil TWA (mg dw/kg)	6.98E-03	1.58E-01	6.98E-03	1.58E-01
Pollen & Nectar Larval (mg/bee)	5.05E-06	2.22E-06	5.05E-06	2.22E-06
365-Day Soil TWA (mg dw/kg)	1.07E-03	5.90E-02	1.07E-03	5.90E-02

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients for the Baseline- No Drift Buffer to Water or Habitat EcoRisk Model Run for Application Scenario PDCP-77 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 150 time a year at a 2-day application interval using 0.027 lb. a.i./Acre to 3750 $ft.^2$ on a nursery loading dock.

Chemical	Dodecylbenzene sulfonate	Ethanolamine	Glycerin	Imidacloprid	Isopropyl alcohol	POE Nonylphenol	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	1.67E-04	1.62E-04	3.24E-05	7.29E-05	6.21E-05	3.81E-04	2.97E-05
Pollen & Nectar (mg/bee)	1.98E-03	1.92E-03	3.85E-04	8.64E-04	7.37E-04	4.51E-03	3.52E-04
Terrestrial Insects (mg dw/kg)	3.89E+01	3.76E+01	7.55E+00	1.69E+01	1.44E+01	8.84E+01	6.90E+00
Terrestrial Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Invertebrates (mg dw/kg)	8.21E-01	2.43E-01	7.71E-02	5.09E-01	2.37E-01	2.10E+03	3.62E-01
Aquatic Insects (mg dw/kg)	1.83E+00	5.18E-01	1.43E-01	9.95E-01	4.52E-01	5.08E+03	6.84E-01
Aquatic Vegetation (mg dw/kg)	3.45E-05	1.17E-04	2.95E-05	3.56E-04	4.96E-05	3.41E-01	6.88E-04
Mixed Terrestrial Vegetation (mg dw/kg)	6.68E+01	6.47E+01	1.30E+01	2.91E+01	2.48E+01	1.52E+02	1.19E+01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	5.58E+01	5.40E+01	1.08E+01	2.43E+01	2.07E+01	1.27E+02	9.91E+00
Terrestrial Grass (mg dw/kg)	9.04E+01	8.75E+01	1.75E+01	3.94E+01	3.36E+01	2.06E+02	1.60E+01
Seeds (mg dw/kg)	1.03E+00	9.92E-01	2.03E-01	4.47E-01	3.86E-01	2.34E+00	1.83E-01
Fruit (mg dw/kg)	4.05E+00	3.91E+00	7.99E-01	1.76E+00	1.52E+00	9.23E+00	7.23E-01
Mammals (mg dw/kg)	2.95E+00	2.85E+00	5.72E-01	1.28E+00	1.10E+00	6.71E+00	5.24E-01
Birds (mg dw/kg)	1.54E+00	1.45E+00	2.92E-01	6.79E-01	5.66E-01	1.71E+02	2.87E-01
Reptiles (mg dw/kg)	2.02E-01	1.94E-01	3.90E-02	8.81E-02	7.48E-02	7.22E+00	3.63E-02
Amphibians (mg dw/kg)	1.67E-01	1.59E-01	3.20E-02	7.30E-02	6.16E-02	9.18E+00	3.04E-02
Fish (mg dw/kg)	1.15E+00	1.54E-01	8.75E-02	5.26E-01	2.34E-01	3.66E+03	4.00E-01
Acute Soils (mg dw/kg)	6.18E-03	5.98E-03	1.20E-03	2.69E-03	2.29E-03	1.40E-02	1.10E-03
Pollen & Nectar Larval (mg/bee)	1.98E-03	1.92E-03	3.84E-04	8.64E-04	7.37E-04	4.51E-03	3.52E-04

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Baseline- No Drift Buffer to Water or Habitat EcoRisk Model Run for Application Scenario PDCP-77 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 150 time a year at a 2-day application interval using 0.027 lb. a.i./Acre to 3750 $ft.^2$ on a nursery loading dock.

Chemical	Dodecylbenzene sulfonate	Ethanolamine	Glycerin	Imidacloprid	Isopropyl alcohol	POE Nonylphenol	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	1.98E-03	1.92E-03	3.85E-04	8.64E-04	7.37E-04	4.51E-03	3.52E-04
Terrestrial Insects (mg dw/kg)	3.89E+01	3.76E+01	7.55E+00	1.69E+01	1.44E+01	8.84E+01	6.90E+00
Terrestrial Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Invertebrates (mg dw/kg)	6.20E-01	1.69E-01	6.87E-02	4.85E-01	2.16E-01	2.07E+03	3.54E-01
Aquatic Insects (mg dw/kg)	1.38E+00	3.79E-01	1.28E-01	9.48E-01	4.13E-01	4.99E+03	6.69E-01
Aquatic Vegetation (mg dw/kg)	3.09E-05	1.16E-04	2.91E-05	3.55E-04	4.92E-05	3.41E-01	6.88E-04
Mixed Terrestrial Vegetation (mg dw/kg)	6.68E+01	6.47E+01	1.30E+01	2.91E+01	2.48E+01	1.52E+02	1.19E+01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	5.58E+01	5.40E+01	1.08E+01	2.43E+01	2.07E+01	1.27E+02	9.91E+00
Terrestrial Grass (mg dw/kg)	9.04E+01	8.75E+01	1.75E+01	3.94E+01	3.36E+01	2.06E+02	1.60E+01
Seeds (mg dw/kg)	1.03E+00	9.92E-01	2.03E-01	4.47E-01	3.86E-01	2.34E+00	1.83E-01
Fruit (mg dw/kg)	4.05E+00	3.91E+00	7.99E-01	1.76E+00	1.52E+00	9.23E+00	7.23E-01
Mammals (mg dw/kg)	5.82E-01	5.63E-01	1.13E-01	2.53E-01	2.16E-01	7.94E+00	1.03E-01
Birds (mg dw/kg)	1.52E-01	1.44E-01	2.93E-02	6.74E-02	5.64E-02	8.78E+01	2.84E-02
Reptiles (mg dw/kg)	7.57E-01	7.28E-01	1.46E-01	3.31E-01	2.81E-01	1.56E+02	1.36E-01
Amphibians (mg dw/kg)	1.23E+00	1.19E+00	2.38E-01	5.42E-01	4.58E-01	2.98E+02	2.24E-01
Fish (mg dw/kg)	8.67E-01	7.85E-02	7.79E-02	5.02E-01	2.14E-01	3.59E+03	3.90E-01
31-Day Soil TWA (mg dw/kg)	6.18E-03	5.98E-03	1.20E-03	2.69E-03	2.29E-03	1.40E-02	1.10E-03
56-Day Soil TWA (mg dw/kg)	1.32E-01	6.19E-02	2.47E-03	1.38E-01	7.20E-03	3.07E-01	6.38E-03
Pollen & Nectar Larval (mg/bee)	8.46E-04	8.18E-04	1.64E-04	3.68E-04	3.14E-04	1.92E-03	1.50E-04
365-Day Soil TWA (mg dw/kg)	1.06E-01	5.06E-02	2.02E-03	1.00E-01	5.90E-03	2.44E-01	5.23E-03

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Residue to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-77 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 150 time a year at a 2-day application interval using 0.027 lb. a.i./Acre to 3750 $ft.^2$ on a nursery loading dock.

Chemical	Dodecylbenzene sulfonate	Ethanolamine	Glycerin	Imidacloprid	Isopropyl alcohol	POE Nonylphenol	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	1.39E-06	1.34E-06	2.69E-07	6.05E-07	5.15E-07	3.16E-06	2.47E-07
Pollen & Nectar (mg/bee)	9.64E-05	4.87E-05	3.61E-06	2.55E-05	8.19E-06	2.22E-04	5.66E-06
Terrestrial Insects (mg dw/kg)	1.89E+00	9.54E-01	7.07E-02	4.99E-01	1.60E-01	4.36E+00	1.11E-01
Terrestrial Invertebrates (mg dw/kg)	1.16E-02	1.99E-05	3.77E-07	1.53E-03	3.15E-05	2.29E+00	7.41E-07
Aquatic Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	3.25E+00	1.64E+00	1.21E-01	8.58E-01	2.75E-01	7.48E+00	1.90E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	2.71E+00	1.37E+00	1.01E-01	7.17E-01	2.30E-01	6.25E+00	1.59E-01
Terrestrial Grass (mg dw/kg)	4.39E+00	2.22E+00	1.64E-01	1.16E+00	3.72E-01	1.01E+01	2.57E-01
Seeds (mg dw/kg)	4.99E-02	2.52E-02	1.94E-03	1.33E-02	4.36E-03	1.16E-01	2.99E-03
Fruit (mg dw/kg)	1.97E-01	9.94E-02	7.63E-03	5.24E-02	1.72E-02	4.59E-01	1.18E-02
Mammals (mg dw/kg)	1.43E-01	7.24E-02	5.36E-03	3.79E-02	1.22E-02	3.30E-01	8.41E-03
Birds (mg dw/kg)	7.18E-02	3.63E-02	2.69E-03	1.90E-02	6.11E-03	1.69E-01	4.22E-03
Reptiles (mg dw/kg)	9.71E-03	4.91E-03	3.63E-04	2.57E-03	8.24E-04	2.24E-02	5.70E-04
Amphibians (mg dw/kg)	7.94E-03	4.01E-03	2.97E-04	2.10E-03	6.74E-04	1.92E-02	4.66E-04
Fish (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acute Soils (mg dw/kg)	1.11E-03	5.26E-04	2.33E-05	1.18E-03	6.49E-05	2.58E-03	5.54E-05
Pollen & Nectar Larval (mg/bee)	4.11E-05	2.08E-05	1.54E-06	1.09E-05	3.49E-06	9.48E-05	2.41E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Residue to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-77 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 150 time a year at a 2-day application interval using 0.027 lb. a.i./Acre to 3750 $ft.^2$ on a nursery loading dock.

Chemical	Dodecylbenzene sulfonate	Ethanolamine	Glycerin	Imidacloprid	Isopropyl alcohol	POE Nonylphenol	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	9.22E-05	4.45E-05	2.45E-06	2.36E-05	6.21E-06	2.13E-04	4.83E-06
Terrestrial Insects (mg dw/kg)	1.81E+00	8.71E-01	4.80E-02	4.62E-01	1.22E-01	4.17E+00	9.46E-02
Terrestrial Invertebrates (mg dw/kg)	1.15E-02	1.94E-05	3.33E-07	1.51E-03	2.91E-05	2.26E+00	7.10E-07
Aquatic Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	3.11E+00	1.50E+00	8.22E-02	7.95E-01	2.09E-01	7.17E+00	1.62E-01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	2.59E+00	1.25E+00	6.87E-02	6.64E-01	1.75E-01	5.99E+00	1.36E-01
Terrestrial Grass (mg dw/kg)	4.20E+00	2.03E+00	1.11E-01	1.07E+00	2.82E-01	9.69E+00	2.19E-01
Seeds (mg dw/kg)	4.77E-02	2.30E-02	1.33E-03	1.23E-02	3.33E-03	1.12E-01	2.56E-03
Fruit (mg dw/kg)	1.88E-01	9.07E-02	5.24E-03	4.86E-02	1.31E-02	4.40E-01	1.01E-02
Mammals (mg dw/kg)	2.71E-02	1.30E-02	7.18E-04	6.92E-03	1.82E-03	3.75E-01	1.42E-03
Birds (mg dw/kg)	6.88E-03	3.32E-03	1.85E-04	1.76E-03	4.68E-04	9.74E-02	3.62E-04
Reptiles (mg dw/kg)	3.50E-02	1.69E-02	9.26E-04	8.94E-03	2.35E-03	5.26E-01	1.83E-03
Amphibians (mg dw/kg)	5.68E-02	2.74E-02	1.51E-03	1.45E-02	3.83E-03	8.26E-01	2.97E-03
Fish (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31-Day Soil TWA (mg dw/kg)	1.10E-03	5.14E-04	2.06E-05	1.16E-03	5.99E-05	2.55E-03	5.31E-05
56-Day Soil TWA (mg dw/kg)	1.10E-03	5.14E-04	2.05E-05	1.15E-03	5.98E-05	2.55E-03	5.30E-05
Pollen & Nectar Larval (mg/bee)	3.93E-05	1.90E-05	1.04E-06	1.01E-05	2.65E-06	9.07E-05	2.06E-06
365-Day Soil TWA (mg dw/kg)	8.76E-04	4.20E-04	1.68E-05	8.34E-04	4.90E-05	2.03E-03	4.34E-05

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients for the Baseline- No Drift Buffer to Water or Habitat EcoRisk Model Run for Application Scenario PDCP-78 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 2 times a year at a 180-day application interval using 0.027 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dodecylbenzene sulfonate	Ethanolamine	Glycerin	Imidacloprid	Isopropyl alcohol	POE Nonylphenol	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	1.67E-04	1.62E-04	3.24E-05	7.29E-05	6.21E-05	3.81E-04	2.97E-05
Pollen & Nectar (mg/bee)	1.98E-03	1.92E-03	3.85E-04	8.64E-04	7.37E-04	4.51E-03	3.52E-04
Terrestrial Insects (mg dw/kg)	3.89E+01	3.76E+01	7.55E+00	1.69E+01	1.44E+01	8.84E+01	6.90E+00
Terrestrial Invertebrates (mg dw/kg)	6.55E-02	2.26E-04	1.93E-05	4.21E-03	1.11E-03	1.27E+01	1.47E-05
Aquatic Invertebrates (mg dw/kg)	2.30E-01	8.28E-02	1.47E-02	4.93E-02	3.17E-02	9.35E+01	1.55E-02
Aquatic Insects (mg dw/kg)	5.12E-01	1.59E-01	2.73E-02	9.63E-02	6.05E-02	2.26E+02	2.90E-02
Aquatic Vegetation (mg dw/kg)	7.12E-06	6.50E-06	2.21E-06	1.33E-05	3.09E-06	5.74E-03	1.33E-05
Mixed Terrestrial Vegetation (mg dw/kg)	6.68E+01	6.47E+01	1.30E+01	2.91E+01	2.48E+01	1.52E+02	1.19E+01
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	5.58E+01	5.40E+01	1.08E+01	2.43E+01	2.07E+01	1.27E+02	9.91E+00
Terrestrial Grass (mg dw/kg)	9.04E+01	8.75E+01	1.75E+01	3.94E+01	3.36E+01	2.06E+02	1.60E+01
Seeds (mg dw/kg)	1.03E+00	9.92E-01	2.03E-01	4.47E-01	3.86E-01	2.34E+00	1.83E-01
Fruit (mg dw/kg)	4.05E+00	3.91E+00	7.99E-01	1.76E+00	1.52E+00	9.23E+00	7.23E-01
Mammals (mg dw/kg)	2.95E+00	2.85E+00	5.72E-01	1.28E+00	1.10E+00	6.71E+00	5.24E-01
Birds (mg dw/kg)	1.50E+00	1.44E+00	2.88E-01	6.47E-01	5.52E-01	1.09E+01	2.64E-01
Reptiles (mg dw/kg)	2.00E-01	1.93E-01	3.88E-02	8.71E-02	7.43E-02	7.58E-01	3.55E-02
Amphibians (mg dw/kg)	1.64E-01	1.58E-01	3.18E-02	7.13E-02	6.08E-02	7.69E-01	2.91E-02
Fish (mg dw/kg)	3.22E-01	8.02E-02	1.67E-02	5.13E-02	3.14E-02	1.64E+02	1.77E-02
Acute Soils (mg dw/kg)	6.27E-03	5.98E-03	1.20E-03	3.23E-03	2.29E-03	1.43E-02	1.10E-03
Pollen & Nectar Larval (mg/bee)	8.46E-04	8.18E-04	1.64E-04	3.68E-04	3.14E-04	1.92E-03	1.50E-04

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Baseline- No Drift Buffer to Water or Habitat EcoRisk Model Run for Application Scenario PDCP-78 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 2 times a year at a 180-day application interval using 0.027 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dodecylbenzene sulfonate	Ethanolamine	Glycerin	Imidacloprid	Isopropyl alcohol	POE Nonylphenol	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	6.77E-04	3.44E-04	1.87E-05	1.82E-04	4.78E-05	1.56E-03	3.73E-05
Terrestrial Insects (mg dw/kg)	1.33E+01	6.74E+00	3.67E-01	3.56E+00	9.36E-01	3.05E+01	7.31E-01
Terrestrial Invertebrates (mg dw/kg)	4.70E-02	1.18E-04	2.58E-06	3.70E-03	2.24E-04	9.14E+00	5.17E-06
Aquatic Invertebrates (mg dw/kg)	6.50E-02	1.15E-02	5.81E-03	3.48E-02	1.67E-02	6.25E+01	1.35E-02
Aquatic Insects (mg dw/kg)	1.45E-01	2.46E-02	1.08E-02	6.80E-02	3.19E-02	1.51E+02	2.53E-02
Aquatic Vegetation (mg dw/kg)	3.58E-06	5.83E-06	1.85E-06	1.31E-05	2.73E-06	5.72E-03	1.32E-05
Mixed Terrestrial Vegetation (mg dw/kg)	2.28E+01	1.16E+01	6.29E-01	6.12E+00	1.61E+00	5.24E+01	1.25E+00
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.90E+01	9.68E+00	5.26E-01	5.11E+00	1.34E+00	4.38E+01	1.05E+00
Terrestrial Grass (mg dw/kg)	3.08E+01	1.57E+01	8.48E-01	8.28E+00	2.17E+00	7.09E+01	1.69E+00
Seeds (mg dw/kg)	3.50E-01	1.78E-01	1.02E-02	9.42E-02	2.56E-02	8.11E-01	1.97E-02
Fruit (mg dw/kg)	1.38E+00	7.01E-01	4.01E-02	3.71E-01	1.01E-01	3.20E+00	7.78E-02
Mammals (mg dw/kg)	1.98E-01	1.01E-01	5.49E-03	5.33E-02	1.40E-02	2.74E+00	1.09E-02
Birds (mg dw/kg)	5.09E-02	2.57E-02	1.45E-03	1.38E-02	3.70E-03	3.30E+00	2.88E-03
Reptiles (mg dw/kg)	2.57E-01	1.30E-01	7.12E-03	6.91E-02	1.82E-02	8.27E+00	1.42E-02
Amphibians (mg dw/kg)	4.18E-01	2.12E-01	1.16E-02	1.13E-01	2.98E-02	1.44E+01	2.32E-02
Fish (mg dw/kg)	9.10E-02	7.00E-03	6.60E-03	3.62E-02	1.65E-02	1.09E+02	1.53E-02
31-Day Soil TWA (mg dw/kg)	4.50E-03	3.13E-03	1.59E-04	2.84E-03	4.63E-04	1.03E-02	3.86E-04
56-Day Soil TWA (mg dw/kg)	3.52E-03	2.07E-03	8.82E-05	2.56E-03	2.57E-04	8.10E-03	2.26E-04
Pollen & Nectar Larval (mg/bee)	2.88E-04	1.47E-04	7.98E-06	7.75E-05	2.04E-05	6.64E-04	1.59E-05
365-Day Soil TWA (mg dw/kg)	1.44E-03	6.76E-04	2.70E-05	1.47E-03	7.87E-05	3.34E-03	6.98E-05

Appendix 3A

Acute Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Residue to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-78 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 2 times a year at a 180-day application interval using 0.027 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dodecylbenzene sulfonate	Ethanolamine	Glycerin	Imidacloprid	Isopropyl alcohol	POE Nonylphenol	Sodium xylene sulfonate
Bee (Contact) (mg/bee)	1.39E-06	1.34E-06	2.69E-07	6.05E-07	5.15E-07	3.16E-06	2.47E-07
Pollen & Nectar (mg/bee)	1.65E-05	1.59E-05	3.20E-06	7.17E-06	6.12E-06	3.75E-05	2.92E-06
Terrestrial Insects (mg dw/kg)	3.23E-01	3.12E-01	6.26E-02	1.40E-01	1.20E-01	7.34E-01	5.73E-02
Terrestrial Invertebrates (mg dw/kg)	5.44E-04	1.87E-06	1.61E-07	3.50E-05	9.23E-06	1.05E-01	1.22E-07
Aquatic Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	5.55E-01	5.37E-01	1.08E-01	2.42E-01	2.06E-01	1.26E+00	9.85E-02
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	4.63E-01	4.48E-01	8.99E-02	2.02E-01	1.72E-01	1.05E+00	8.22E-02
Terrestrial Grass (mg dw/kg)	7.50E-01	7.26E-01	1.45E-01	3.27E-01	2.79E-01	1.71E+00	1.33E-01
Seeds (mg dw/kg)	8.51E-03	8.24E-03	1.68E-03	3.71E-03	3.20E-03	1.94E-02	1.52E-03
Fruit (mg dw/kg)	3.36E-02	3.25E-02	6.64E-03	1.46E-02	1.26E-02	7.66E-02	6.00E-03
Mammals (mg dw/kg)	2.45E-02	2.37E-02	4.75E-03	1.07E-02	9.09E-03	5.57E-02	4.35E-03
Birds (mg dw/kg)	1.23E-02	1.19E-02	2.38E-03	5.34E-03	4.56E-03	2.81E-02	2.18E-03
Reptiles (mg dw/kg)	1.66E-03	1.60E-03	3.22E-04	7.22E-04	6.16E-04	3.77E-03	2.94E-04
Amphibians (mg dw/kg)	1.35E-03	1.31E-03	2.63E-04	5.90E-04	5.04E-04	3.13E-03	2.41E-04
Fish (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acute Soils (mg dw/kg)	5.20E-05	4.96E-05	9.92E-06	2.68E-05	1.90E-05	1.18E-04	9.10E-06
Pollen & Nectar Larval (mg/bee)	7.02E-06	6.79E-06	1.36E-06	3.06E-06	2.61E-06	1.60E-05	1.25E-06

Appendix 3A

Chronic Estimated Environmental Concentrations of active and inert ingredients for the Reduced Exposure- No Residue to Water, 25-ft. Drift Buffer to Habitat EcoRisk Model Run for Application Scenario PDCP-78 with Marathon II Greenhouse and Nursery Insecticide with No Foam B up to 2 times a year at a 180-day application interval using 0.027 lb. a.i./Acre to 0.75 acres in a nursery production area.

Chemical	Dodecylbenzene sulfonate	Ethanolamine	Glycerin	Imidacloprid	Isopropyl alcohol	POE Nonylphenol	Sodium xylene sulfonate
Pollen & Nectar (mg/bee)	5.62E-06	2.86E-06	1.55E-07	1.51E-06	3.96E-07	1.29E-05	3.09E-07
Terrestrial Insects (mg dw/kg)	1.10E-01	5.59E-02	3.05E-03	2.95E-02	7.77E-03	2.53E-01	6.06E-03
Terrestrial Invertebrates (mg dw/kg)	3.90E-04	9.82E-07	2.14E-08	3.07E-05	1.86E-06	7.58E-02	4.29E-08
Aquatic Invertebrates (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Insects (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aquatic Vegetation (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mixed Terrestrial Vegetation (mg dw/kg)	1.89E-01	9.62E-02	5.22E-03	5.08E-02	1.33E-02	4.35E-01	1.04E-02
Terrestrial Broad-Leafed Vegetation (mg dw/kg)	1.58E-01	8.03E-02	4.36E-03	4.24E-02	1.11E-02	3.63E-01	8.70E-03
Terrestrial Grass (mg dw/kg)	2.56E-01	1.30E-01	7.04E-03	6.87E-02	1.80E-02	5.88E-01	1.41E-02
Seeds (mg dw/kg)	2.90E-03	1.48E-03	8.43E-05	7.82E-04	2.13E-04	6.73E-03	1.64E-04
Fruit (mg dw/kg)	1.15E-02	5.82E-03	3.33E-04	3.08E-03	8.39E-04	2.65E-02	6.46E-04
Mammals (mg dw/kg)	1.65E-03	8.37E-04	4.56E-05	4.42E-04	1.16E-04	2.27E-02	9.08E-05
Birds (mg dw/kg)	4.19E-04	2.13E-04	1.17E-05	1.12E-04	2.98E-05	5.85E-03	2.32E-05
Reptiles (mg dw/kg)	2.13E-03	1.08E-03	5.88E-05	5.72E-04	1.50E-04	3.19E-02	1.17E-04
Amphibians (mg dw/kg)	3.46E-03	1.76E-03	9.57E-05	9.28E-04	2.44E-04	4.91E-02	1.91E-04
Fish (mg dw/kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31-Day Soil TWA (mg dw/kg)	3.73E-05	2.60E-05	1.32E-06	2.35E-05	3.84E-06	8.55E-05	3.21E-06
56-Day Soil TWA (mg dw/kg)	2.92E-05	1.72E-05	7.32E-07	2.12E-05	2.13E-06	6.72E-05	1.88E-06
Pollen & Nectar Larval (mg/bee)	2.39E-06	1.22E-06	6.62E-08	6.43E-07	1.69E-07	5.51E-06	1.32E-07
365-Day Soil TWA (mg dw/kg)	1.20E-05	5.61E-06	2.24E-07	1.22E-05	6.53E-07	2.77E-05	5.79E-07

Appendix Eco-C. Toxicity Reference Values

Toxicity Reference Values for Dinotefuran.

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Toad_AQ	Acute	99500 µg/L	USEPA, 1999l	TRV based on the NOEL for mortality in rainbow trout
Arroyo Toad_AQ	Chronic	1658 µg/L	USEPA, 1999l	TRV based on the 1/60th the NOEL for mortality in rainbow trout
Arroyo Toad_TE	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Arroyo Toad_TE	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
California Red-legged Frog_AQ	Acute	99500 µg/L	USEPA, 1999l	TRV based on the NOEL for mortality in rainbow trout
California Red-legged Frog_AQ	Chronic	1658 µg/L	USEPA, 1999l	TRV based on 1/60th the NOEL for mortality in rainbow trout
California Red-legged Frog_TE	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
California Red-legged Frog_TE	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
California Tiger Salamander_AQ	Acute	99500 µg/L	USEPA, 1999l	TRV based on the NOEL for mortality in rainbow trout
California Tiger Salamander_AQ	Chronic	1658 µg/L	USEPA, 1999l	TRV based on 1/60th the NOEL for mortality in rainbow trout
California Tiger Salamander_TE	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
California Tiger Salamander_TE	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Foothill Yellow-legged Frog_AQ	Acute	99500 µg/L	USEPA, 1999l	TRV based on the NOEL for mortality in rainbow trout
Foothill Yellow-legged Frog_AQ	Chronic	1658 µg/L	USEPA, 1999l	TRV based on 1/60th the NOEL for mortality in rainbow trout
Foothill Yellow-legged Frog_TE	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Foothill Yellow-legged Frog_TE	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Southern Torrent Salamander_AQ	Acute	99500 µg/L	USEPA, 1999l	TRV based on NOEL for mortality in rat
Southern Torrent Salamander_AQ	Chronic	1658 µg/L	USEPA, 1999l	TRV based on 1/60th the NOEL for mortality in rainbow trout
Southern Torrent Salamander_TE	Acute	1000 mg/kg	USEPA, 1999l	TRV based on the NOEL for mortality in the Japanese quail
Southern Torrent Salamander_TE	Chronic	33.33 mg/kg	USEPA, 1999l	TRV based on 1/30th the NOEL for mortality in the Japanese quail

Toxicity Reference Values for Dinotefuran (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Western Spadefoot_AQ	Acute	99500 µg/L	USEPA, 1999l	TRV based on the NOEL for mortality in rainbow trout
Western Spadefoot_AQ	Chronic	1658 µg/L	USEPA, 1999l	TRV based on 1/60th the NOEL for mortality in rainbow trout
Western Spadefoot_TE	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Western Spadefoot_TE	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Black Abalone	Acute	141000 µg/L	USEPA, 2001b	TRV based on the NOEL in the eastern oyster
Black Abalone	Chronic	2350 µg/L	USEPA, 2001b	TRV based on 1/60th the NOEC in the eastern oyster
California Freshwater Shrimp	Acute	101.6 µg/L	Barbee and Stout, 2009	TRV based on 1/20th the 96-hour LC50 in red swamp crayfish
California Freshwater Shrimp	Chronic	10.16 µg/L	Barbee and Stout, 2009	TRV based on 1/200th the 96-hour LC50 in red swamp crayfish
Mimic Tryonia	Acute	141000 µg/L	USEPA, 2001b	TRV based on the NOEL in the eastern oyster
Mimic Tryonia	Chronic	2350 µg/L	USEPA, 2001b	TRV based on 1/60th the NOEC in the eastern oyster
Shasta Crayfish	Acute	101.6 µg/L	Barbee and Stout, 2009	TRV based on 1/20th the LC50 in the red swamp crayfish
Shasta Crayfish	Chronic	10.16 µg/L	Barbee and Stout, 2009	TRV based on 1/200th the LC50 in the red swamp crayfish
Tomales Isopod	Acute	48415 µg/L	USEPA, 2000w	TRV based on 1/20th the EC50 for immobility in the water flea
Tomales Isopod	Chronic	95300 µg/L	USEPA, 2000w	TRV based on the NOEL for mortality and reproduction in the water flea
Vernal Pool Fairy Shrimp	Acute	48415 µg/L	USEPA, 2000w	TRV based on 1/20th the EC50 for immobility in the water flea
Vernal Pool Fairy Shrimp	Chronic	95300 µg/L	USEPA, 2000w	TRV based on the NOEL for mortality and reproduction in the water flea
California Brown Pelican	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
California Brown Pelican	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
California Condor	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
California Condor	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Cooper's Hawk	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Cooper's Hawk	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail

Toxicity Reference Values for Dinotefuran (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Fulvous Whistling-duck	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Fulvous Whistling-duck	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Mourning Dove	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Mourning Dove	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Osprey	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Osprey	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Purple Martin	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Purple Martin	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Tricolored Blackbird /red-winged blackbird	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Tricolored Blackbird /red-winged blackbird	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Western Yellow-billed Cuckoo	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Western Yellow-billed Cuckoo	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
White-tailed Kite	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
White-tailed Kite	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Yellow rail	Acute	1000 mg/kg	USEPA, 2000v	TRV based on the NOEL for mortality in the Japanese quail
Yellow rail	Chronic	33.33 mg/kg	USEPA, 2000v	TRV based on 1/30th the NOEL for mortality in the Japanese quail
Arroyo Chub	Acute	99300 µg/L	USEPA, 2000x	TRV based on the NOEL for mortality in bluegill sunfish
Arroyo Chub	Chronic	1655 µg/L	USEPA, 2000x	TRV based on 1/60th the NOEL for mortality in bluegill sunfish
Chinook Salmon--Central Valley spring-run ESU	Acute	99500 µg/L	USEPA, 1999l	TRV based on the NOEL for mortality in rainbow trout
Chinook Salmon--Central Valley spring-run ESU	Chronic	1658 µg/L	USEPA, 1999l	TRV based on 1/60th the NOEL for mortality in rainbow trout
Coastal Cutthroat Trout	Acute	99500 µg/L	USEPA, 1999l	TRV based on the NOEL for mortality in rainbow trout
Coastal Cutthroat Trout	Chronic	1658 µg/L	USEPA, 1999l	TRV based on 1/60th the NOEL for mortality in rainbow trout

Toxicity Reference Values for Dinotefuran (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Delta smelt	Acute	109000 µg/L	USEPA, 2001c	TRV based on the NOEL for mortality in the sheepshead minnow
Delta smelt	Chronic	1817 µg/L	USEPA, 2001c	TRV based on 1/60th the NOEL for mortality in the sheepshead minnow
Desert Pupfish	Acute	99300 µg/L	USEPA, 2000x	TRV based on the NOEL for mortality in the bluegill sunfish
Desert Pupfish	Chronic	1655 µg/L	USEPA, 2000x	TRV based on 1/60th the NOEL for mortality in the bluegill sunfish
Sacramento splittail	Acute	109000 µg/L	USEPA, 2001c	TRV based on the NOEL for mortality in the sheepshead minnow
Sacramento splittail	Chronic	1817 µg/L	USEPA, 2001c	TRV based on 1/60th the NOEL for mortality in the sheepshead minnow
Tidewater Goby	Acute	109000 µg/L	USEPA, 2001c	TRV based on the NOEL for mortality in the sheepshead minnow
Tidewater Goby	Chronic	1817 µg/L	USEPA, 2001c	TRV based on 1/60th the NOEL for mortality in the sheepshead minnow
American Badger	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat
American Badger	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in the dog
Big Free-tailed Bat	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat
Big Free-tailed Bat	Chronic	38 mg/kg	USEPA, 2004b	TRV based on the NOEL for decrease in body weight/weight gain, hematological/adrenal histopathology in the rat
Mule Deer	Acute	400 mg/kg	USEPA, 2004b	TRV based on the NOEL for developmental effects in rabbit
Mule Deer	Chronic	125 mg/kg	USEPA, 2004b	TRV based on the NOEL for developmental effects in rabbit
Nelson's Antelope Squirrel	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat
Nelson's Antelope Squirrel	Chronic	38 mg/kg	USEPA, 2004b	TRV based on NOEL for decrease in body weight/weight gain, hematological/adrenal histopathology in rat
Northwestern San Diego Pocket Mouse	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat
Northwestern San Diego Pocket Mouse	Chronic	444.2 mg/kg	USEPA, 2004b	TRV based on 1/10th NOEL for lowered body weight or weight gain in the mouse
Riparian brush rabbit	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat
Riparian brush rabbit	Chronic	125 mg/kg	USEPA, 2004b	TRV based on the NOEL for developmental effects in rabbit
Southern (Ramona) Grasshopper Mouse	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat
Southern (Ramona) Grasshopper Mouse	Chronic	38 mg/kg	USEPA, 2004b	TRV based on NOEL for decrease in body weight/weight gain, hematological/adrenal histopathology in rat
southern sea otter	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat

Toxicity Reference Values for Dinotefuran (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
southern sea otter	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog
Southwestern River Otter	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat
Southwestern River Otter	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog
Alameda Whipsnake	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Alameda Whipsnake	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Blunt-nosed Leopard Lizard	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Blunt-nosed Leopard Lizard	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Desert Tortoise	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Desert Tortoise	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
East Pacific Green Sea Turtle	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).

Toxicity Reference Values for Dinotefuran (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
East Pacific Green Sea Turtle	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Giant Garter Snake	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Giant Garter Snake	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Northern red-diamond rattlesnake	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Northern red-diamond rattlesnake	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Western Fence Lizard	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Western Fence Lizard	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Western Pond Turtle	Acute	400 mg/kg	USEPA, 2004b	TRV based on 1/5th the LD50 in the rat. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).

Toxicity Reference Values for Dinotefuran (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Western Pond Turtle	Chronic	30.7 mg/kg	USEPA, 2004b	TRV based on 1/10th the NOEL for hemorrhagic lymph nodes and body weight change in dog. Reptiles likely have comparable sensitivity as mammals since similar doses of imidacloprid are used for control of parasites (Mehlhom *et al.* 2005).
Blennosperma vernal pool andrenid bee	Acute	0.0188 µg/org	USEPA, 2004b	TRV based on 1/2.5th the LD50 in the honey bee
Blennosperma vernal pool andrenid bee	Acute	0.0092 µg/org	USEPA, 2004b	TRV based on 1/2.5th the LD50 in the honey bee
Earthworm	Acute	1.7 mg/kg soil	FAO, 2013	Based on the NOEC for acute toxicity
Earthworm	Chronic	0.2 mg/kg soil	FAO, 2013	Based on the NOEC for reproductive effects
Honey Bee (adult)	Acute	0.003 µg/bee	USEPA, 2017b	TRV based on 1/2.5th the LD50 in the honey bee
Honey Bee (adult)	Acute	0.0092 µg/bee	USEPA, 2004b	TRV based on 1/2.5th the LD50 in the honey bee
Honey Bee (adult)	Chronic	0.0015 µg/bee	USEPA, 2017b	TRV based on the NOAEC in the 10-day chronic adult honey bee test
Honey Bee (larvae)	Acute	1.32 µg/bee	USEPA, 2017b	TRV based on 1/2.5th the 72-hr LD50 in the larval honey bee
Honey Bee (larvae)	Chronic	0.013 µg/bee	USEPA, 2017b	TRV based on 1/2.5th the LOAEC in the 8-day chronic larval honey bee test
San Joaquin tiger beetle	Acute	0.0188 µg/org	USEPA, 2004b	TRV based on 1/2.5th the LD50 in the honey bee
San Joaquin tiger beetle	Acute	0.0092 µg/org	USEPA, 2004b	TRV based on 1/2.5th the LD50 in the honey bee

Appendix 3A

Toxicity Reference Values for Imidacloprid.

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Toad_AQ	Acute	16700 µg/l	Feng *et al.*, 2004	based on a NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
Arroyo Toad_AQ	Chronic	278.3 µg/l	Feng *et al.*, 2004	based on 1/60th of the NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
Arroyo Toad_TE	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
Arroyo Toad_TE	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail
California Red-legged Frog_AQ	Acute	16700 µg/l	Feng *et al.*, 2004	based on a NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
California Red-legged Frog_AQ	Chronic	278.3 µg/l	Feng *et al.*, 2004	based on 1/60th of the NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
California Red-legged Frog_TE	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
California Red-legged Frog_TE	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail
California Tiger Salamander_AQ	Acute	16700 µg/l	Feng *et al.*, 2004	based on a NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
California Tiger Salamander_AQ	Chronic	278.3 µg/l	Feng *et al.*, 2004	based on 1/60th of the NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
California Tiger Salamander_TE	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
California Tiger Salamander_TE	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail
Foothill Yellow-legged Frog_AQ	Acute	16700 µg/l	Feng *et al.*, 2004	based on a NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
Foothill Yellow-legged Frog_AQ	Chronic	278.3 µg/l	Feng *et al.*, 2004	based on 1/60th of the NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
Foothill Yellow-legged Frog_TE	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
Foothill Yellow-legged Frog_TE	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail
Southern Torrent Salamander_AQ	Acute	16700 µg/l	Feng *et al.*, 2004	based on a NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
Southern Torrent Salamander_AQ	Chronic	278.3 µg/l	Feng *et al.*, 2004	based on 1/60th of the NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
Southern Torrent Salamander_TE	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
Southern Torrent Salamander_TE	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail

Toxicity Reference Values for Imidacloprid (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Western Spadefoot_AQ	Acute	16700 µg/l	Feng *et al.*, 2004	based on a NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
Western Spadefoot_AQ	Chronic	278.3 µg/l	Feng *et al.*, 2004	based on 1/60th of the NOEL for mortality in a LC50 test for the Asian grass frog (*Rana limnocharis*)
Western Spadefoot_TE	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
Western Spadefoot_TE	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail
Black Abalone	Acute	7250 µg/l	USEPA, 1991e	TRV based on 1/20th the EC50 for the eastern oyster.
Black Abalone	Chronic	725 µg/l	USEPA, 1991e	TRV based on 1/200th the EC50 for the eastern oyster.
California Freshwater Shrimp	Acute	1.9 µg/l	USEPA, 1990e	TRV based on 1/20th the LC50 in the mysid.
California Freshwater Shrimp	Chronic	0.19 µg/l	USEPA, 1990e	TRV based on 1/200th the LC50 in the mysid.
Mimic Tryonia	Acute	7250 µg/l	USEPA, 1991e	TRV based on 1/20th the EC50 for the eastern oyster.
Mimic Tryonia	Chronic	725 µg/l	USEPA, 1991e	TRV based on 1/200th the EC50 for the eastern oyster.
Shasta Crayfish	Acute	1.9 µg/l	USEPA, 1990e	TRV based on 1/20th the LC50 in the mysid.
Shasta Crayfish	Chronic	0.19 µg/l	USEPA, 1990e	TRV based on 1/200th the LC50 in the mysid.
Tomales Isopod	Acute	1.9 µg/l	USEPA, 1990e	TRV based on 1/20th the LC50 in the mysid.
Tomales Isopod	Chronic	0.19 µg/l	USEPA, 1990e	TRV based on 1/200th the LC50 in the mysid.
Vernal Pool Fairy Shrimp	Acute	42000 µg/l	USEPA, 1990q	TRV based on NOEC for acute effects in the water flea.
Vernal Pool Fairy Shrimp	Chronic	1800 µg/l	USEPA, 1990q	TRV based on NOEC for chronic effects in the water flea.
California Brown Pelican	Acute	15.23 mg/kg	USEPA, 1990g	based on 1/10th the LD50 in the northern bobwhite
California Brown Pelican	Chronic	1.523 mg/kg	USEPA, 1990g	based on 1/100th the LD50 in the northern bobwhite
California Condor	Acute	15.23 mg/kg	USEPA, 1990g	based on 1/10th the LD50 in the northern bobwhite
California Condor	Chronic	1.523 mg/kg	USEPA, 1990g	based on 1/100th the LD50 in the northern bobwhite
Cooper's Hawk	Acute	15.23 mg/kg	USEPA, 1990g	based on 1/10th the LD50 in the northern bobwhite
Cooper's Hawk	Chronic	1.523 mg/kg	USEPA, 1990g	based on 1/100th the LD50 in the northern bobwhite
Fulvous Whistling-duck	Acute	15.23 mg/kg	USEPA, 1990g	based on 1/10th the LD50 in the northern bobwhite
Fulvous Whistling-duck	Chronic	1.523 mg/kg	USEPA, 1990g	based on 1/100th the LD50 in the northern bobwhite
Mourning Dove	Acute	15.23 mg/kg	USEPA, 1990g	based on 1/10th the LD50 in the northern bobwhite
Mourning Dove	Chronic	1.523 mg/kg	USEPA, 1990g	based on 1/100th the LD50 in the northern bobwhite
Osprey	Acute	15.23 mg/kg	USEPA, 1990g	based on 1/10th the LD50 in the northern bobwhite
Osprey	Chronic	1.523 mg/kg	USEPA, 1990g	based on 1/100th the LD50 in the northern bobwhite
Purple Martin	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
Purple Martin	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail

Toxicity Reference Values for Imidacloprid (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Tricolored Blackbird /red-winged blackbird	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
Tricolored Blackbird /red-winged blackbird	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail
Western Yellow-billed Cuckoo	Acute	3.1 mg/kg	USEPA, 1990p	based on NOEL for acute effects for the Japanese quail
Western Yellow-billed Cuckoo	Chronic	0.103 mg/kg	USEPA, 1990p	based on 1/30th the NOEL for acute effects for the Japanese quail
White-tailed Kite	Acute	15.23 mg/kg	USEPA, 1990g	based on 1/10th the LD50 in the northern bobwhite
White-tailed Kite	Chronic	1.523 mg/kg	USEPA, 1990g	based on 1/100th the LD50 in the northern bobwhite
Yellow rail	Acute	15.23 mg/kg	USEPA, 1990g	based on 1/10th the LD50 in the northern bobwhite
Yellow rail	Chronic	1.523 mg/kg	USEPA, 1990g	based on 1/100th the LD50 in the northern bobwhite
Arroyo Chub	Acute	25000 µg/l	USEPA, 1990o	TRV based on the NOEL for the bluegill sunfish.
Arroyo Chub	Chronic	416.7 µg/l	USEPA, 1990o	TRV based on 1/60th the NOEL for the bluegill sunfish.
Chinook Salmon--Central Valley spring-run ESU	Acute	42000 µg/l	USEPA, 1991f	TRV based on NOEC for acute effects in the rainbow trout.
Chinook Salmon--Central Valley spring-run ESU	Chronic	1200 µg/l	USEPA, 1991f	TRV based on NOEC for chronic effects in the rainbow trout.
Coastal Cutthroat Trout	Acute	42000 µg/l	USEPA, 1991f	TRV based on NOEC for acute effects in the rainbow trout.
Coastal Cutthroat Trout	Chronic	1200 µg/l	USEPA, 1991f	TRV based on NOEC for chronic effects in the rainbow trout.
Delta smelt	Acute	58200 µg/l	USEPA, 1990f	TRV based on the NOEC for acute effects in the sheepshead minnow.
Delta smelt	Chronic	970 µg/l	USEPA, 1990f	TRV based on 1/60th the NOEC for acute effects in the sheepshead minnow.
Desert Pupfish	Acute	25000 µg/l	USEPA, 1990o	based on the NOEC for acute effects in bluegill sunfish
Desert Pupfish	Chronic	416.7 µg/l	USEPA, 1990o	based on 1/60th the NOEC for acute effects in bluegill sunfish
Sacramento splittail	Acute	58200 µg/l	USEPA, 1990f	TRV based on the NOEC for acute effects in the sheepshead minnow.
Sacramento splittail	Chronic	970 µg/l	USEPA, 1990f	TRV based on 1/60th the NOEC for acute effects in the sheepshead minnow.
Tidewater Goby	Acute	58200 µg/l	USEPA, 1990f	TRV based on the NOEC for acute effects in the sheepshead minnow.
Tidewater Goby	Chronic	970 µg/l	USEPA, 1990f	TRV based on 1/60th the NOEC for acute effects in the sheepshead minnow.

Toxicity Reference Values for Imidacloprid (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
American Badger	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
American Badger	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Big Free-tailed Bat	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Big Free-tailed Bat	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Mule Deer	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Mule Deer	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Nelson's Antelope Squirrel	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Nelson's Antelope Squirrel	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Northwestern San Diego Pocket Mouse	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Northwestern San Diego Pocket Mouse	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Riparian brush rabbit	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Riparian brush rabbit	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Southern (Ramona) Grasshopper Mouse	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Southern (Ramona) Grasshopper Mouse	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
southern sea otter	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
southern sea otter	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Southwestern River Otter	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Southwestern River Otter	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.

Toxicity Reference Values for Imidacloprid (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Alameda Whipsnake	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Alameda Whipsnake	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Blunt-nosed Leopard Lizard	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Blunt-nosed Leopard Lizard	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Desert Tortoise	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Desert Tortoise	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
East Pacific Green Sea Turtle	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
East Pacific Green Sea Turtle	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Giant Garter Snake	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Giant Garter Snake	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Northern red-diamond rattlesnake	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Northern red-diamond rattlesnake	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Western Fence Lizard	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Western Fence Lizard	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Western Pond Turtle	Acute	26 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/5th the LD50 in the mouse.
Western Pond Turtle	Chronic	1.3 mg/kg	Bomann, 1989 in INCHEM, 2001	TRV based on 1/100th the LD50 in the mouse.
Blennosperma vernal pool andrenid bee	Acute	0.18 g a.i./ha	EFSA, 2008	based on 40% of the contact LD50 for the cereal aphid parasite
Blennosperma vernal pool andrenid bee	Acute	0.00156 µg/org	USEPA, 1990i	TRV based on 40% of the oral LD50 in the honey bee

Toxicity Reference Values for Imidacloprid (continued).

Species	Acute/ Chronic	TRV		Reference	Notes
Earthworm	Acute	0.23	mg/kg soil	Luo *et al.*, 1999	based on 1/10th the LC50 for earthworms
Earthworm	Chronic	0.023	mg/kg soil	Luo *et al.*, 1999	based on 1/100th the LC50 for earthworms
Honey Bee (adult)	Acute	0.0172	µg/bee	USEPA, 1990i	TRV based on 40% of the contact LD50 in the honey bee
Honey Bee (adult)	Acute	0.00156	µg/bee	USEPA, 1990i	TRV based on 40% of the oral LD50 in the honey bee
Honey Bee (adult)	Chronic	0.00016	µg/bee	USEPA, 2016	based on the NOAEC of a 10-day chronic oral toxicity test
Honey Bee (larvae)	Acute	1.668	µg/larvae	Dai *et al.*, 2017	TRV based on 72-hr LD50 in vitro raised larval honey bees
Honey Bee (larvae)	Chronic	0.0018	µg/Larvae	USEPA, 2016	based on the NOAEC of a 21-day chronic repeat dose test
San Joaquin tiger beetle	Acute	0.18	g a.i./ha	EFSA, 2008	based on 40% of the contact LD50 for the cereal aphid parasite
San Joaquin tiger beetle	Acute	0.00156	µg/org	USEPA, 1990i	TRV based on 40% of the oral LD50 in the honey bee

Toxicity Reference Values for Ethanolamine.

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Toad_AQ	Acute	11000 µg/L	de Zwart and Slooff, 1987	TRV based 1/20th the LC50 for the African clawed frog
Arroyo Toad_AQ	Chronic	1100 µg/L	de Zwart and Slooff, 1987	TRV based 1/200th the LC50 for the African clawed frog
California Red-legged Frog_AQ	Acute	11000 µg/L	de Zwart and Slooff, 1987	TRV based 1/20th the LC50 for the African clawed frog
California Red-legged Frog_AQ	Chronic	1100 µg/L	de Zwart and Slooff, 1987	TRV based 1/200th the LC50 for the African clawed frog
California Tiger Salamander_AQ	Acute	11000 µg/L	de Zwart and Slooff, 1987	TRV based 1/20th the LC50 for the African clawed frog
California Tiger Salamander_AQ	Chronic	1100 µg/L	de Zwart and Slooff, 1987	TRV based 1/200th the LC50 for the African clawed frog
Foothill Yellow-legged Frog_AQ	Acute	11000 µg/L	de Zwart and Slooff, 1987	TRV based 1/20th the LC50 for the African clawed frog
Foothill Yellow-legged Frog_AQ	Chronic	1100 µg/L	de Zwart and Slooff, 1987	TRV based 1/200th the LC50 for the African clawed frog
Southern Torrent Salamander_AQ	Acute	11000 µg/L	de Zwart and Slooff, 1987	TRV based 1/20th the LC50 for the African clawed frog
Southern Torrent Salamander_AQ	Chronic	1100 µg/L	de Zwart and Slooff, 1987	TRV based 1/200th the LC50 for the African clawed frog
Western Spadefoot_AQ	Acute	11000 µg/L	de Zwart and Slooff, 1987	TRV based 1/20th the LC50 for the African clawed frog
Western Spadefoot_AQ	Chronic	1100 µg/L	de Zwart and Slooff, 1987	TRV based 1/200th the LC50 for the African clawed frog
Black Abalone	Acute	9 µg/L	Libralato et al, 2010	TRV based on the acute NOEC in the Mediterranean mussel
Black Abalone	Chronic	0.9 µg/L	Libralato et al, 2010	TRV based on 1/10th the acute NOEC in the Mediterranean mussel
California Freshwater Shrimp	Acute	7000 µg/L	HSDB, 2006e	TRV based on 1/20th the LC50 of the water flea
California Freshwater Shrimp	Chronic	700 µg/L	HSDB, 2006e	TRV based on 1/200th the LC50 of the water flea
Mimic Tryonia	Acute	9 µg/L	Libralato et al, 2010	TRV based on the acute NOEC in the Mediterranean mussel
Mimic Tryonia	Chronic	0.9 µg/L	Libralato et al, 2010	TRV based on 1/10th the acute NOEC in the Mediterranean mussel
Shasta Crayfish	Acute	7000 µg/L	HSDB, 2006e	TRV based on 1/20th the LC50 of the water flea
Shasta Crayfish	Chronic	700 µg/L	HSDB, 2006e	TRV based on 1/200th the LC50 of the water flea

Toxicity Reference Values for Ethanolamine (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Tomales Isopod	Acute	7000 µg/L	HSDB, 2006e	TRV based on 1/20th the LC50 of the water flea
Tomales Isopod	Chronic	700 µg/L	HSDB, 2006e	TRV based on 1/200th the LC50 of the water flea
Vernal Pool Fairy Shrimp	Acute	7000 µg/L	HSDB, 2006e	TRV based on 1/20th the LC50 of the water flea
Vernal Pool Fairy Shrimp	Chronic	700 µg/L	HSDB, 2006e	TRV based on 1/200th the LC50 of the water flea
Arroyo Chub	Acute	250000 µg/L	Bridie *et al.*, 1979	TRV based on 1/20th the LC50 in the goldfish
Arroyo Chub	Chronic	25000 µg/L	Bridie *et al.*, 1979	TRV based on 1/200th the LC50 in the goldfish
Chinook Salmon--Central Valley spring-run ESU	Acute	250000 µg/L	Bridie *et al.*, 1979	TRV based on 1/20th the LC50 in the goldfish
Chinook Salmon--Central Valley spring-run ESU	Chronic	25000 µg/L	Bridie *et al.*, 1979	TRV based on 1/200th the LC50 in the goldfish
Coastal Cutthroat Trout	Acute	250000 µg/L	Bridie *et al.*, 1979	TRV based on 1/20th the LC50 in the goldfish
Coastal Cutthroat Trout	Chronic	25000 µg/L	Bridie *et al.*, 1979	TRV based on 1/200th the LC50 in the goldfish
Desert Pupfish	Acute	250000 µg/L	Bridie *et al.*, 1979	TRV based on 1/20th the LC50 in the goldfish
Desert Pupfish	Chronic	25000 µg/L	Bridie *et al.*, 1979	TRV based on 1/200th the LC50 in the goldfish
Sacramento splittail	Acute	250000 µg/L	Bridie *et al.*, 1979	TRV based on 1/20th the LC50 in the goldfish
Sacramento splittail	Chronic	25000 µg/L	Bridie *et al.*, 1979	TRV based on 1/200th the LC50 in the goldfish
American Badger	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
American Badger	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat
Big Free-tailed Bat	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
Big Free-tailed Bat	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat
Mule Deer	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
Mule Deer	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat
Nelson's Antelope Squirrel	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
Nelson's Antelope Squirrel	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat
Northwestern San Diego Pocket Mouse	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
Northwestern San Diego Pocket Mouse	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat

Toxicity Reference Values for Ethanolamine (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Riparian brush rabbit	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
Riparian brush rabbit	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat
Southern (Ramona) Grasshopper Mouse	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
Southern (Ramona) Grasshopper Mouse	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat
southern sea otter	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
southern sea otter	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat
Southwestern River Otter	Acute	124 mg/kg	HSDB, 2006e	TRV based on 1/5th the LD50 in the rat
Southwestern River Otter	Chronic	6.2 mg/kg	HSDB, 2006e	TRV based on 1/100th the LD50 in the rat

Toxicity Reference Values for Glycerin.

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Toad_AQ	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Arroyo Toad_AQ	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
California Red-legged Frog_AQ	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
California Red-legged Frog_AQ	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
California Tiger Salamander_AQ	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
California Tiger Salamander_AQ	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
Foothill Yellow-legged Frog_AQ	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Foothill Yellow-legged Frog_AQ	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
Southern Torrent Salamander_AQ	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Southern Torrent Salamander_AQ	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
Western Spadefoot_AQ	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Western Spadefoot_AQ	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
California Freshwater Shrimp	Acute	500000 µg/L	Eur. Com., 2000e	TRV based on 1/200th the EC50 in the water flea.
California Freshwater Shrimp	Chronic	50000 µg/L	Eur. Com., 2000e	TRV based on 1/20th the EC50 in the water flea.
Shasta Crayfish	Acute	500000 µg/L	Eur. Com., 2000e	TRV based on 1/20th the EC50 in the water flea.
Shasta Crayfish	Chronic	50000 µg/L	Eur. Com., 2000e	TRV based on 1/200th the EC50 in the water flea.
Tomales Isopod	Acute	500000 µg/L	Eur. Com., 2000e	TRV based on 1/20th the EC50 in the water flea.
Tomales Isopod	Chronic	50000 µg/L	Eur. Com., 2000e	TRV based on 1/200th the EC50 in the water flea.

Toxicity Reference Values for Glycerin (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Vernal Pool Fairy Shrimp	Acute	500000 µg/L	Eur. Com., 2000e	TRV based on 1/20th the EC50 in the water flea.
Vernal Pool Fairy Shrimp	Chronic	50000 µg/L	Eur. Com., 2000e	TRV based on 1/200th the EC50 in the water flea.
Arroyo Chub	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Arroyo Chub	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
Chinook Salmon--Central Valley spring-run ESU	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Chinook Salmon--Central Valley spring-run ESU	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
Coastal Cutthroat Trout	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Coastal Cutthroat Trout	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
Desert Pupfish	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Desert Pupfish	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
Sacramento splittail	Acute	3400000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/20th the LC50 in the rainbow trout.
Sacramento splittail	Chronic	340000 µg/L	Mayer and Ellersieck, 1986	TRV based on 1/200th the LC50 in the rainbow trout.
American Badger	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.
American Badger	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.
Big Free-tailed Bat	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.
Big Free-tailed Bat	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.
Mule Deer	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.

Toxicity Reference Values for Glycerin (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Mule Deer	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.
Nelson's Antelope Squirrel	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.
Nelson's Antelope Squirrel	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.
Northwestern San Diego Pocket Mouse	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.
Northwestern San Diego Pocket Mouse	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.
Riparian brush rabbit	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.
Riparian brush rabbit	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.
Southern (Ramona) Grasshopper Mouse	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.
Southern (Ramona) Grasshopper Mouse	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.
southern sea otter	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.
southern sea otter	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.
Southwestern River Otter	Acute	2520 mg/kg	Eur. Com., 2000e	TRV based on 1/5th the LD50 in the rat.
Southwestern River Otter	Chronic	126 mg/kg	Eur. Com., 2000e	TRV based on 1/100th the LD50 in the rat.

Toxicity Reference Values for Isopropyl Alcohol.

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Toad_AQ	Acute	22537500 µg/L	Munch, 1972	based on the acute narcotic threshold in the leopard frog tadpole
Arroyo Toad_AQ	Chronic	375625 µg/L	Munch, 1972	based on 1/60th the acute narcotic threshold in the leopard frog tadpole
California Red-legged Frog_AQ	Acute	22537500 µg/L	Munch, 1972	based on the acute narcotic threshold in the leopard frog tadpole
California Red-legged Frog_AQ	Chronic	375625 µg/L	Munch, 1972	based on 1/60th the acute narcotic threshold in the leopard frog tadpole
California Tiger Salamander_AQ	Acute	22537500 µg/L	Munch, 1972	based on the acute narcotic threshold in the leopard frog tadpole
California Tiger Salamander_AQ	Chronic	375625 µg/L	Munch, 1972	based on 1/60th the acute narcotic threshold in the leopard frog tadpole
Foothill Yellow-legged Frog_AQ	Acute	22537500 µg/L	Munch, 1972	based on the acute narcotic threshold in the leopard frog tadpole
Foothill Yellow-legged Frog_AQ	Chronic	375625 µg/L	Munch, 1972	based on 1/60th the acute narcotic threshold in the leopard frog tadpole
Southern Torrent Salamander_AQ	Acute	22537500 µg/L	Munch, 1972	based on the acute narcotic threshold in the leopard frog tadpole
Southern Torrent Salamander_AQ	Chronic	375625 µg/L	Munch, 1972	based on 1/60th the acute narcotic threshold in the leopard frog tadpole
Western Spadefoot_AQ	Acute	22537500 µg/L	Munch, 1972	based on the acute narcotic threshold in the leopard frog tadpole
Western Spadefoot_AQ	Chronic	375625 µg/L	Munch, 1972	based on 1/60th the acute narcotic threshold in the leopard frog tadpole
California Freshwater Shrimp	Acute	57500 µg/L	Blackman, 1974	based on 1/20th the LC50 in the brown shrimp
California Freshwater Shrimp	Chronic	5750 µg/L	Blackman, 1974	based on 1/200th the LC50 in the brown shrimp
Shasta Crayfish	Acute	57500 µg/L	Blackman., 1974	based on 1/20th the LC50 in the brown shrimp
Shasta Crayfish	Chronic	5750 µg/L	Blackman, 1974	based on 1/200th the LC50 in the brown shrimp
Tomales Isopod	Acute	57500 µg/L	Blackman, 1974	based on 1/20th the LC50 in the brown shrimp
Tomales Isopod	Chronic	5750 µg/L	Blackman, 1974	based on 1/200th the LC50 in the brown shrimp

Toxicity Reference Values for Isopropyl Alcohol (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Vernal Pool Fairy Shrimp	Acute	579965 µg/L	Calleja *et al.*, 1994	based on 1/20th the LC50 fairy shrimp
Vernal Pool Fairy Shrimp	Chronic	57996.5 µg/L	Calleja *et al.*, 1994	based on 1/200th the LC50 fairy shrimp
Arroyo Chub	Acute	556500 µg/L	Mattson *et al.*, 1976	based on 1/20th the LC50 of the fathead minnow
Arroyo Chub	Chronic	55650 µg/L	Mattson *et al.*, 1976	based on 1/200th the LC50 of the fathead minnow
Chinook Salmon--Central Valley spring-run ESU	Acute	650000 µg/L	Mattson *et al.*, 1976	based on 1/20th the LC50 of the rainbow trout
Chinook Salmon--Central Valley spring-run ESU	Chronic	65000 µg/L	Mattson *et al.*, 1976	based on 1/200th the LC50 of the rainbow trout
Coastal Cutthroat Trout	Acute	650000 µg/L	Mattson *et al.*, 1976	based on 1/20th the LC50 of the rainbow trout
Coastal Cutthroat Trout	Chronic	65000 µg/L	Mattson *et al.*, 1976	based on 1/200th the LC50 of the rainbow trout
Desert Pupfish	Acute	556500 µg/L	USEPA, 1986o	based on 1/20th the LC50 of the fathead minnow
Desert Pupfish	Chronic	55650 µg/L	USEPA, 1986o	based on 1/200th the LC50 of the fathead minnow
Sacramento splittail	Acute	650000 µg/L	Mattson *et al.*, 1976	based on 1/20th the LC50 of the rainbow trout
Sacramento splittail	Chronic	65000 µg/L	Mattson *et al.*, 1976	based on 1/200th the LC50 of the rainbow trout
American Badger	Acute	966 mg/kg	UNEP, 1997b	based on 1/5th the LD50 of the dog
American Badger	Chronic	48.3 mg/kg	UNEP, 1997b	based on 1/100th the LD50 of the dog
Big Free-tailed Bat	Acute	880 mg/kg	Kimura *et al.*, 1971	based on 1/5th the LD50 of the rat
Big Free-tailed Bat	Chronic	500 mg/kg	USEPA, 1995b	based on the NOAEL for systemic toxicity in the rat in two generation reproduction study
Mule Deer	Acute	240 mg/kg	Tyl *et al.*, 1994	based on NOAEL for maternal mortality after 14-day exposure in New Zealand White Rabbits
Mule Deer	Chronic	8 mg/kg	Tyl *et al.*, 1994	based on 1/30th the NOAEL for maternal mortality after 14-day exposure in New Zealand White Rabbits
Nelson's Antelope Squirrel	Acute	880 mg/kg	Kimura *et al.*, 1971	based on 1/5th the LD50 of the rat
Nelson's Antelope Squirrel	Chronic	500 mg/kg	USEPA, 1995b	based on the NOAEL for systemic toxicity in the rat in two generation reproduction study

Toxicity Reference Values for Isopropyl Alcohol (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Northwestern San Diego Pocket Mouse	Acute	880 mg/kg	Kimura *et al.*, 1971	based on 1/5th the LD50 of the rat
Northwestern San Diego Pocket Mouse	Chronic	500 mg/kg	USEPA, 1995b	based on the NOAEL for systemic toxicity in the rat in two generation reproduction study
Riparian brush rabbit	Acute	240 mg/kg	Tyl *et al.*, 1994	based on NOAEL for maternal mortality after 14-day exposure in New Zealand White Rabbits
Riparian brush rabbit	Chronic	8 mg/kg	Tyl *et al.*, 1994	based on 1/30th the NOAEL for maternal mortality after 14-day exposure in New Zealand White Rabbits
Southern (Ramona) Grasshopper Mouse	Acute	880 mg/kg	Kimura *et al.*, 1971	based on 1/5th the LD50 of the rat
Southern (Ramona) Grasshopper Mouse	Chronic	500 mg/kg	USEPA, 1995b	based on the NOAEL for systemic toxicity in the rat in two generation reproduction study
southern sea otter	Acute	966 mg/kg	UNEP, 1997b	based on 1/5th the LD50 of the dog
southern sea otter	Chronic	48.3 mg/kg	UNEP, 1997b	based on 1/100th the LD50 of the dog
Southwestern River Otter	Acute	966 mg/kg	UNEP, 1997b	based on 1/5th the LD50 of the dog
Southwestern River Otter	Chronic	48.3 mg/kg	UNEP, 1997b	based on 1/100th the LD50 of the dog

Toxicity Reference Values for POE Nonylphenol.

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Toad_AQ	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the fathead minnow
Arroyo Toad_AQ	Chronic	50 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEC for growth in fathead minnows
California Red-legged Frog_AQ	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the fathead minnow
California Red-legged Frog_AQ	Chronic	50 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEC for growth in fathead minnows
California Tiger Salamander_AQ	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the fathead minnow
California Tiger Salamander_AQ	Chronic	50 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEC for growth in fathead minnows
Foothill Yellow-legged Frog_AQ	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the fathead minnow
Foothill Yellow-legged Frog_AQ	Chronic	50 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEC for growth in fathead minnows
Southern Torrent Salamander_AQ	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the fathead minnow
Southern Torrent Salamander_AQ	Chronic	50 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEC for growth in fathead minnows
Western Spadefoot_AQ	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the fathead minnow
Western Spadefoot_AQ	Chronic	50 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEC for growth in fathead minnows
California Freshwater Shrimp	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the water flea
California Freshwater Shrimp	Chronic	90 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEL for mortality in the water flea
Shasta Crayfish	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the water flea
Shasta Crayfish	Chronic	90 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEL for mortality in the water flea
Tomales Isopod	Acute	45 µg/L	Hall *et al.*, 1989	based on 1/20th the LC50 in the mysid
Tomales Isopod	Chronic	4.5 µg/L	Hall *et al.*, 1989	based on 1/200th the LC50 in the mysid
Vernal Pool Fairy Shrimp	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the water flea
Vernal Pool Fairy Shrimp	Chronic	90 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEL for mortality in the water flea
Arroyo Chub	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the fathead minnow
Arroyo Chub	Chronic	50 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEC for growth in fathead minnows
Chinook Salmon--Central Valley spring-run ESU	Acute	235 µg/L	Calamari *et al.*, 1973	based on 1/20th the LC50 in the rainbow trout

Toxicity Reference Values for POE Nonylphenol (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Chinook Salmon--Central Valley spring-run ESU	Chronic	23.5 µg/L	Calamari *et al.*, 1973	based on 1/200th the LC50 in the rainbow trout
Coastal Cutthroat Trout	Acute	235 µg/L	Calamari *et al.*, 1973	based on 1/20th the LC50 in the rainbow trout
Coastal Cutthroat Trout	Chronic	23.5 µg/L	Calamari *et al.*, 1973	based on 1/200th the LC50 in the rainbow trout
Desert Pupfish	Acute	230 µg/L	Dorn *et al.*, 1993	based on 1/20th the LC50 in the fathead minnow
Desert Pupfish	Chronic	50 µg/L	Dorn *et al.*, 1993	based on 1/20th the subchronic NOAEC for growth in fathead minnows
Sacramento splittail	Acute	235 µg/L	Calamari *et al.*, 1973	based on 1/20th the LC50 in the rainbow trout
Sacramento splittail	Chronic	23.5 µg/L	Calamari *et al.*, 1973	based on 1/200th the LC50 in the rainbow trout
American Badger	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat
American Badger	Chronic	28 mg/kg	Smyth and Calandra, 1969	based on the chronic NOAEL for increased liver to body weight ratio in the dog
Big Free-tailed Bat	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Big Free-tailed Bat	Chronic	1.67 mg/kg	Meyer *et al.*, 1988	based on 1/30th the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Mule Deer	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Mule Deer	Chronic	1.67 mg/kg	Meyer *et al.*, 1988	based on 1/30th the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Nelson's Antelope Squirrel	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Nelson's Antelope Squirrel	Chronic	1.67 mg/kg	Meyer *et al.*, 1988	based on 1/30th the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Northwestern San Diego Pocket Mouse	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Northwestern San Diego Pocket Mouse	Chronic	1.67 mg/kg	Meyer *et al.*, 1988	based on 1/30th the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Riparian brush rabbit	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat

Toxicity Reference Values for POE Nonylphenol (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Riparian brush rabbit	Chronic	1.67 mg/kg	Meyer *et al.*, 1988	based on 1/30th the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Southern (Ramona) Grasshopper Mouse	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Southern (Ramona) Grasshopper Mouse	Chronic	1.67 mg/kg	Meyer *et al.*, 1988	based on 1/30th the acute NOAEL for decreased weight gain, decreased food consumption in the rat
southern sea otter	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat
southern sea otter	Chronic	28 mg/kg	Smyth and Calandra, 1969	based on the chronic NOAEL for increased liver to body weight ratio in the dog
Southwestern River Otter	Acute	50 mg/kg	Meyer *et al.*, 1988	based on the acute NOAEL for decreased weight gain, decreased food consumption in the rat
Southwestern River Otter	Chronic	28 mg/kg	Smyth and Calandra, 1969	based on the chronic NOAEL for increased liver to body weight ratio in the dog

Toxicity Reference Values for Sodium Dodecylbenzene Sulfonate.

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Toad_AQ	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Arroyo Toad_AQ	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Arroyo Toad_TE	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Arroyo Toad_TE	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
California Red-legged Frog_AQ	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
California Red-legged Frog_AQ	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
California Red-legged Frog_TE	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
California Red-legged Frog_TE	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
California Tiger Salamander_AQ	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
California Tiger Salamander_AQ	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
California Tiger Salamander_TE	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
California Tiger Salamander_TE	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Foothill Yellow-legged Frog_AQ	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Foothill Yellow-legged Frog_AQ	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate

Toxicity Reference Values for Sodium Dodecylbenzene Sulfonate (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Foothill Yellow-legged Frog_TE	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Foothill Yellow-legged Frog_TE	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Southern Torrent Salamander_AQ	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Southern Torrent Salamander_AQ	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Southern Torrent Salamander_TE	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Southern Torrent Salamander_TE	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Western Spadefoot_AQ	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Western Spadefoot_AQ	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Western Spadefoot_TE	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Western Spadefoot_TE	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
California Freshwater Shrimp	Acute	210 µg/L	Supriyono *et al.*, 1998	TRV based on 1/20th the LC50 in the Kuruma shrimp
California Freshwater Shrimp	Chronic	2.1 µg/L	Supriyono *et al.*, 1998	TRV based on 1/20th of the LOAEL for subchronic effects on gills in the Kuruma shrimp
Shasta Crayfish	Acute	210 µg/L	Supriyono *et al.*, 1998	TRV based on 1/20th the LC50 in the Kuruma shrimp
Shasta Crayfish	Chronic	2.1 µg/L	Supriyono *et al.*, 1998	TRV based on 1/20th of the LOAEL for subchronic effects on gills in the Kuruma shrimp
Tomales Isopod	Acute	155 µg/L	Versteeg and Rawlings, 2002	TRV based 1/20th the LC50 of the scud

Toxicity Reference Values for Sodium Dodecylbenzene Sulfonate (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Tomales Isopod	Chronic	15.5 µg/L	Versteeg and Rawlings, 2002	TRV based on 1/200th the LC50 of the scud
Vernal Pool Fairy Shrimp	Acute	592 µg/L	da Silva Coelho and Rocha, 2010	TRV based on 1/20th the LC50 of ceriodaphnia
Vernal Pool Fairy Shrimp	Chronic	59.2 µg/L	da Silva Coelho and Rocha, 2010	TRV based on 1/200th the LC50 of ceriodaphnia
California Brown Pelican	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
California Brown Pelican	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
California Condor	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
California Condor	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Cooper's Hawk	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Cooper's Hawk	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Fulvous Whistling-duck	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Fulvous Whistling-duck	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Mourning Dove	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Mourning Dove	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate

Toxicity Reference Values for Sodium Dodecylbenzene Sulfonate (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Osprey	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Osprey	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Purple Martin	Acute	279 mg/kg	USEPA, 2006j	based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Purple Martin	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Tricolored Blackbird /red-winged blackbird	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Tricolored Blackbird /red-winged blackbird	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Western Yellow-billed Cuckoo	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Western Yellow-billed Cuckoo	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
White-tailed Kite	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
White-tailed Kite	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Yellow rail	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Yellow rail	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate

Toxicity Reference Values for Sodium Dodecylbenzene Sulfonate (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Chub	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Arroyo Chub	Chronic	8.4 µg/L	USEPA, 2006j	based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Chinook Salmon--Central Valley spring-run ESU	Acute	84 µg/L	USEPA, 2006j	based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Chinook Salmon--Central Valley spring-run ESU	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Coastal Cutthroat Trout	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Coastal Cutthroat Trout	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Desert Pupfish	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Desert Pupfish	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Sacramento splittail	Acute	84 µg/L	USEPA, 2006j	TRV based on 1/20th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
Sacramento splittail	Chronic	8.4 µg/L	USEPA, 2006j	TRV based on 1/200th the LC50 of the rainbow trout to C11,C12 alkylbenzene sulfonate
American Badger	Acute	130 mg/kg	Gloxhuber, 1974	TRV based on 1/5th the LD50 in the rat
American Badger	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study
Big Free-tailed Bat	Acute	130 mg/kg	Gloxhuber, 1974	TRV based on 1/5th the LD50 in the rat
Big Free-tailed Bat	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study
Mule Deer	Acute	130 mg/kg	Gloxhuber, 1974	based on 1/5th the LD50 in the rat
Mule Deer	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study
Nelson's Antelope Squirrel	Acute	130 mg/kg	Gloxhuber, 1974	TRV based on 1/5th the LD50 in the rat
Nelson's Antelope Squirrel	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study
Northwestern San Diego Pocket Mouse	Acute	130 mg/kg	Gloxhuber, 1974	TRV based on 1/5th the LD50 in the rat
Northwestern San Diego Pocket Mouse	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study

Toxicity Reference Values for Sodium Dodecylbenzene Sulfonate (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Riparian brush rabbit	Acute	130 mg/kg	Gloxhuber, 1974	TRV based on 1/5th the LD50 in the rat
Riparian brush rabbit	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study
Southern (Ramona) Grasshopper Mouse	Acute	130 mg/kg	Gloxhuber, 1974	TRV based on 1/5th the LD50 in the rat
Southern (Ramona) Grasshopper Mouse	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study
southern sea otter	Acute	130 mg/kg	Gloxhuber, 1974	TRV based on 1/5th the LD50 in the rat
southern sea otter	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study
Southwestern River Otter	Acute	130 mg/kg	Gloxhuber, 1974	TRV based on 1/5th the LD50 in the rat
Southwestern River Otter	Chronic	40 mg/kg	UNEP, 2005b	TRV based on NOAEL for Increased caecum weight and slight kidney damage in rats in 6 mo. chronic study
Alameda Whipsnake	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Alameda Whipsnake	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Blunt-nosed Leopard Lizard	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Blunt-nosed Leopard Lizard	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Desert Tortoise	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Desert Tortoise	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
East Pacific Green Sea Turtle	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
East Pacific Green Sea Turtle	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate

Toxicity Reference Values for Sodium Dodecylbenzene Sulfonate (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Giant Garter Snake	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Giant Garter Snake	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Northern red-diamond rattlesnake	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Northern red-diamond rattlesnake	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Western Fence Lizard	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Western Fence Lizard	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Western Pond Turtle	Acute	279 mg/kg	USEPA, 2006j	TRV based on the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Western Pond Turtle	Chronic	9.3 mg/kg	USEPA, 2006j	TRV based on 1/30th the NOAEL in bobwhite quail for an acute toxicity test of Nacconol 90G consisting of 87% Sodium dodecylbenzene sulfonate
Earthworm	Acute	0.25 mg/kg	Mieure *et al.*, 1990	TRV based on NOEC for mortality and growth in 14-day day test
Earthworm	Chronic	0.00833 mg/kg	Mieure *et al.*, 1990	TRV based on 1/30th NOEC for mortality and growth in 14-day day test

Appendix Eco-D. Nonylphenol Considerations in Ecological Risk Assessment

Appendix G of the HHRA for Urban/Residential and Nursery Treatments, Pierce's Disease Control Program reviews the environmental fate as is relates to the conversion of POE nonylphenol to nonylphenol.

Four of the scenarios assessed for PDCP included No Foam B, the adjuvant which contains POE nonylphenol. These are PDCP-64, PDCP-65, PCDP-77, and PCDP-78.

To evaluate the potential impacts of the degradation of POE nonylphenol to nonylphenol on ecological receptors, all POE nonylphenol is assumed to convert to nonylphenol in the environment. To perform this conversion, the molecular weight of POE nonylphenol (assumed 727, based on the average of NP4E and NP9E) was compared to the molecular weight of nonylphenol (220.36), resulting in a ratio of 0.3. Environmental concentrations of POE nonylphenol were then multiplied by 0.3 to derive an estimate for environmental concentrations of nonylphenol. The assumed converted concentrations of POE nonylphenol to nonylphenol in surface water and sediment pore water concentration are displayed in **Table Eco-D-1**.

Degradation of POE nonylphenol occurs over time with nonylphenol being an intermediate degradate. Environmental half-lives for nonylphenol range from approximately 30 days in soil to 150 days in surface water. Assuming that the maximum environmental concentrations of nonylphenol could equal that resulting from complete conversion of POE nonylphenol is highly conservative. Regardless, RQs based on the assumption of complete conversion of POE nonylphenol to nonylphenol were estimated and appear in **Table Eco-D-2**.

No toxicity data for nonylphenol are available for birds, terrestrial amphibians, reptiles, or insects. Therefore, the potential for any additional risk related to degradation of POE nonylphenol to nonylphenol for these taxonomic groups cannot be assessed. Available TRVs for nonylphenol appear in **Table Eco-D-3.**

Potential Risk Related to Nonylphenol for Application Scenario PDCP-64

For Freshwater Pool or Wetland Species, no acute LOCs exhibit any exceedances when Safari 20 SG, along with No Foam B (**Table Eco-2**), are assessed. However, estimated acute RQs for nonylphenol would cause the total acute RQ for the Sacramento splittails to exceed LOCs. Aquatic amphibians, as well as Sacramento splittails, have chronic RQs from nonylphenol that exceed LOCs. In the discussion in Section 6.4.2 regarding risk to aquatic invertebrates and Section 6.4.5 regarding chronic risk for birds that feed in aquatic habitats, implementation of the Program Management Practices presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a) were deemed sufficient to reduce movement of No Foam B constituents to surface water. Therefore, no additional actions are necessary to protect Freshwater Pool or Wetland Species once POE nonylphenol has degraded to nonylphenol.

For Freshwater River Species, acute RQs exceed LOCs for only the southwestern river otter when Safari 20 SG, along with No Foam B (**Table Eco-2**), are assessed. No estimated acute RQs for nonylphenol (**Table Eco-D-2**) would cause the total RQ for any other Freshwater River Species to exceed LOCs. Estimated chronic RQs related to nonylphenol alone for aquatic-phase amphibians exceed LOCs where no exceedances are observed when Safari 20 SG, along with No Foam B, are assessed. Implementation of Program Management Practices, as well as the likely dilution factors in riverine habitats, are considered sufficient to reduce exposure such that any potential for adverse effects from conversion of POE nonylphenol to nonylphenol is low.

Estuarine Species exhibit both acute and chronic RQs related to exposure to nonylphenol that exceed LOCs. As mentioned for Freshwater River Species, implementation of Program Management Practices, as well as the likely dilution factors, in estuarine habitats are considered sufficient to reduce exposure such that any potential for adverse effects from conversion of POE nonylphenol to nonylphenol is low.

Southern sea otters exhibit acute and chronic RQs that exceed LOCs when Safari 20 SG, along with No Foam B (**Table Eco-2**), are assessed. The assessment for potential risk following degradation of POE nonylphenol to nonylphenol does not alter the conclusion that implementation of Program Management Practices, as well as the likely dilution factors in marine habitats, are sufficient to reduce exposure such that any potential for adverse effects from conversion of POE nonylphenol to nonylphenol is low.

For Terrestrial Species, many mammals have acute and chronic RQs that exceed LOCs when Safari 20 SG, along with No Foam B (**Table Eco-2**), are assessed for use on loading docks. Therefore, the exceedances of LOCs for acute or chronic RQs for terrestrial mammals related to exposure to nonylphenol do not change the conclusions following the discussion in Section 5.4.6. The mammal species with exceedances from exposure to nonylphenol all have diets consisting of terrestrial plants or insects. The small size of the nursery loading dock makes it unlikely that mammals that forage on insect or plant-based diets will acquire a greater than anticipated proportion of their diets from treated nursery loading docks or areas within approximately 25 ft. of the loading dock. Therefore, it can be concluded that the potential for adverse effects for terrestrial foraging mammals is low.

Potential Risk Related to Nonylphenol for Application Scenario PDCP-65

All acute and chronic RQs related to nonylphenol alone are below LOCs. No acute or chronic RQ for any ecological receptor are of sufficient magnitude that the risk conclusions would differ following degradation from POE nonylphenol to nonylphenol from the assessment of Safari 20 SG, along with No Foam B, for use nursery production areas.

Potential Risk Related to Nonylphenol for Application Scenario PDCP-77

For Freshwater Pool or Wetland Species, no acute LOCs exhibit any exceedances when Marathon II Greenhouse and Nursery Insecticide, along with No Foam B (**Table Eco-10**), are assessed. However, estimated acute RQs for nonylphenol would cause the total acute RQ Sacramento splittails to exceed LOCs. Aquatic amphibians, as well as Sacramento splittails, have

chronic RQs from nonylphenol that exceed LOCs. In the discussions in Section 6.9.2 regarding risk to aquatic invertebrates and Section 5.9.5 regarding chronic risk for birds that feed in aquatic habitats, implementation of the Program Management Practices presented in Section 2.11 of the Main Body of the Statewide PEIR (CDFA, 2014a) were deemed sufficient to reduce movement of No Foam B constituents to surface water.

For Freshwater River Species, acute RQs exceed LOCs for southwestern river otter when Marathon II Greenhouse and Nursery Insecticide, along with No Foam B (**Table Eco-10**), are assessed. No estimated acute RQs for nonylphenol would cause the total RQ for any other Freshwater River Species to exceed LOCs. Estimated chronic RQs related to nonylphenol alone (**Table Eco-D-2**) for aquatic-phase amphibians exceed LOCs where no exceedances were observed when Marathon II Greenhouse and Nursery Insecticide, along with No Foam B (**Table Eco-10**), are assessed. Implementation of Program Management Practices, as well as the likely dilution factors in riverine habitats, are considered sufficient to reduce exposure such that any potential for adverse effects from conversion of POE nonylphenol to nonylphenol is low.

Estuarine Species exhibit both acute and chronic RQs related to exposure to nonylphenol alone (**Table Eco-D-2**) that exceed LOCs. As mentioned for Freshwater River Species, implementation of Program Management Practices, as well as the likely dilution factors, in estuarine habitats are sufficient to reduce exposure such that any potential for adverse effects from conversion of POE nonylphenol to nonylphenol is low.

Southern sea otters exhibit acute and chronic RQs that exceed LOCs when Marathon II Greenhouse and Nursery Insecticide along with No Foam B are assessed (**Table Eco-10**). The acute and chronic RQs for nonylphenol alone (**Table Eco-D-2**) do not exceed LOCs and are not of sufficient magnitude to cause any additional total RQ to exceed LOCs.

For Terrestrial Species, many mammals have acute and chronic RQs (**Table Eco-10**) that exceed LOCs when Marathon II Greenhouse and Nursery Insecticide along with No Foam B are assessed for use on loading docks. Therefore, the exceedances of LOCs for acute or chronic RQs for terrestrial mammals related to exposure to nonylphenol alone (**Table Eco-D-2**) do not change the conclusions following the discussion in Section 6.9.6. The mammal species with exceedances from exposure to nonylphenol all have diets consisting of terrestrial plants or insects. The small size of the nursery loading dock makes it unlikely that mammals that forage on insect or have plant-based diets will acquire a greater than anticipated proportion of their diets from treated nursery loading docks or areas within approximately 25 ft. of the loading dock. Therefore, it can be concluded that the potential for adverse effects for terrestrial foraging mammals is low.

Potential Risk Related to Nonylphenol for Application Scenario PDCP-78

All acute and chronic RQs related to nonylphenol were below LOCs. No acute or chronic RQ for any ecological receptor are of sufficient magnitude that the risk conclusions would differ following degradation of POE nonylphenol to nonylphenol from the assessment of Safari 20 SG along with No Foam B in nursery production areas.

Conclusions

Although nonylphenol is more persistent than POE nonylphenol, particularly in the aquatic environments, and more toxic to aquatic receptors, the assessment presented here does not alter the conclusions provided in Section 8 of the Ecological Risk Assessment.

References

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Appendix 3A

Table Eco-D-1. Estimated water concentrations for nonylphenol following degradation of POE nonylphenol.

EcoRisk Model Run	Chemical	Upper 90th Ranked Limnetic C_w (µg/L)	Upper 90th Ranked Benthic C_w (µg/L)	Upper 90th Ranked 21-Day Limnetic C_w (µg/L)	Upper 90th Ranked 21-Day Benthic C_w (µg/L)	Upper 90th Ranked 31-Day Limnetic C_w (µg/L)	Upper 90th Ranked 31-Day Benthic C_w (µg/L)	Upper 90th Ranked 60-Day Limnetic C_w (µg/L)	Average Water Temp of EXAMS Pond (^{0}C)
PCDP-64									
Baseline- No Drift Buffer to Water or Habitat	POE Nonylphenol	3.60	3.19	3.52	3.18	3.52	3.18	3.50	25
Baseline- No Drift Buffer to Water or Habitat	Nonylphenol	1.08	0.957	1.056	0.954	1.056	0.954	1.05	25
PDCP-65									
Baseline- No Drift Buffer to Water or Habitat	POE Nonylphenol	0.20	0.07	0.12	0.07	0.12	0.07	0.08	25
Baseline- No Drift Buffer to Water or Habitat	Nonylphenol	0.06	0.021	0.036	0.021	0.036	0.021	0.024	25
PDCP-77									
Baseline- No Drift Buffer to Water or Habitat	POE Nonylphenol	1.65	1.46	1.62	1.46	1.62	1.46	1.61	25
Baseline- No Drift Buffer to Water or Habitat	Nonylphenol	0.495	0.438	0.486	0.438	0.486	0.438	0.483	25
PDCP-78									
Baseline- No Drift Buffer to Water or Habitat	POE Nonylphenol	0.08	0.02	0.05	0.02	0.05	0.02	0.04	25
Baseline- No Drift Buffer to Water or Habitat	Nonylphenol	0.024	0.006	0.015	0.006	0.015	0.006	0.012	25

Table Eco-D-2. Potential risk related to nonylphenol following degradation of POE nonylphenol for Application Scenarios PDCP-64, PDCP-65, PDCP-77, and PDCP-78.

	PDCP-64		PDCP-65		PDCP-77		PDCP-78	
	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic
Freshwater Pool or Wetland Species								
aquatic California tiger salamander	0.18	**1.75**	0.00	0.04	0.08	***0.81***	0.00	0.02
aquatic California red-legged frog	0.18	**1.75**	0.00	0.04	0.08	***0.81***	0.00	0.02
terrestrial California red-legged frog	NA	NA	NA	NA	NA	NA	NA	NA
aquatic western spadefoot	0.18	**1.75**	0.00	0.04	0.08	***0.81***	0.00	0.02
vernal pool fairy shrimp	0.39	0.11	0.02	0.00	0.18	0.05	0.00	0.00
Tomales isopod	0.39	0.11	0.02	0.07	0.18	0.05	0.00	0.00
Sacramento splittail	**1.27**	**12.35**	0.07	0.3	***0.58***	**5.68**	0.03	0.12
desert pupfish	0.14	0.14	0.00	0.00	0.06	0.07	0.00	0.00
giant garter snake	NA	NA	NA	NA	NA	NA	NA	NA
western pond turtle	NA	NA	NA	NA	NA	NA	NA	NA
tricolored blackbird	NA	NA	NA	NA	NA	NA	NA	NA
fulvous whistling-duck	NA	NA	NA	NA	NA	NA	NA	NA
yellow rail	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater River Species								
aquatic arroyo toad	0.18	**1.75**	0.00	0.04	0.08	***0.81***	0.00	0.02
aquatic southern torrent salamander	0.18	**1.75**	0.00	0.04	0.08	***0.81***	0.00	0.02
terrestrial southern torrent salamander	NA	NA	NA	NA	NA	NA	NA	NA
aquatic foothill yellow-legged frog	0.18	**1.75**	0.00	0.04	0.08	***0.81***	0.00	0.02

Table Eco-D-2 (Cont.)

	PDCP-64		PDCP-65		PDCP-77		PDCP-78	
	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic
terrestrial foothill yellow-legged frog	NA	NA	NA	NA	NA	NA	NA	NA
California freshwater shrimp	0.39	0.11	0.02	0.00	0.18	0.05	0.00	0.00
Shasta crayfish	0.39	0.11	0.02	0.00	0.18	0.05	0.00	0.00
arroyo chub	0.14	0.14	0.00	0.00	0.06	0.07	0.00	0.00
coastal cutthroat trout	0.15	0.18	0.00	0.00	0.07	0.08	0.00	0.00
Chinook salmon	0.15	0.18	0.00	0.00	0.07	0.08	0.00	0.00
osprey	NA	NA	NA	NA	NA	NA	NA	NA
southwestern river otter	0.49	0.00	0.02	0.00	0.23	0.00	0.00	0.00
Estuarine Species								
mimic tryonia	***0.57***	**5.59**	0.03	0.20	0.26	**2.57**	0.01	0.08
tidewater goby	**1.27**	**12.35**	0.07	0.30	***0.58***	**5.68**	0.03	0.12
delta smelt	**1.27**	**12.35**	0.07	0.30	***0.58***	**5.68**	0.03	0.12
Marine Species								
black abalone	***0.57***	**5.59**	0.03	0.20	0.26	**2.57**	0.01	0.08
East Pacific green sea turtle	NA	NA	NA	NA	NA	NA	NA	NA
California brown pelican	NA	NA	NA	NA	NA	NA	NA	NA
southern sea otter	***0.60***	0.00	0.03	0.00	0.27	0.00	0.01	0.00
Terrestrial Species								
terrestrial California tiger salamander	NA	NA	NA	NA	NA	NA	NA	NA
terrestrial arroyo toad	NA	NA	NA	NA	NA	NA	NA	NA
terrestrial western spadefoot	NA	NA	NA	NA	NA	NA	NA	NA
Alameda whipsnake	NA	NA	NA	NA	NA	NA	NA	NA
northern red diamond rattlesnake	NA	NA	NA	NA	NA	NA	NA	NA
desert tortoise	NA	NA	NA	NA	NA	NA	NA	NA

Table Eco-D-2 (Cont.)

	PDCP-64		PDCP-65		PDCP-77		PDCP-78	
	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic
western fence lizard	NA	NA	NA	NA	NA	NA	NA	NA
blunt-nosed leopard lizard	NA	NA	NA	NA	NA	NA	NA	NA
mourning dove	NA	NA	NA	NA	NA	NA	NA	NA
California condor	NA	NA	NA	NA	NA	NA	NA	NA
white-tailed kite	NA	NA	NA	NA	NA	NA	NA	NA
Cooper's hawk	NA	NA	NA	NA	NA	NA	NA	NA
western yellow-billed cuckoo	NA	NA	NA	NA	NA	NA	NA	NA
purple martin	NA	NA	NA	NA	NA	NA	NA	NA
mule deer	***0.84***	0.00	0.02	0.00	0.39	0.00	0.00	0.00
riparian brush rabbit	**4.99**	**1.35**	0.12	0.26	**2.29**	***0.62***	0.05	0.10
American badger	0.18	0.00	0.00	0.00	0.08	0.00	0.00	0.00
northwestern San Diego pocket mouse	**7.81**	**7.04**	0.15	**1.15**	**3.59**	**3.24**	0.06	0.45
big free-tailed bat	**2.97**	0.00	0.08	0.00	**1.36**	0.00	0.03	0.00
southern grasshopper mouse	**2.80**	0.28	0.08	0.06	**1.29**	0.13	0.03	0.02
Nelson's antelope squirrel	4.07	0.14	0.10	0.03	**1.87**	0.07	0.04	0.01
earthworm	***0.73***	**7.02**	0.01	0.11	0.33	**3.22**	0.00	0.05
honey bee-adult (contact)	NA		NA		NA		NA	
honey bee-adult (oral)	NA	NA	NA	NA	NA	NA	NA	NA
Honey bee-larvae	NA	NA	NA	NA	NA	NA	NA	NA
Blennosperma vernal pool andrenid bee (contact)	NA		NA		NA			
Blennosperma vernal pool andrenid bee (oral)	NA		NA		NA		NA	
San Joaquin tiger beetle (contact)	NA		NA		NA	NA		

Table Eco-D-3. Toxicity Reference Values for Nonylphenol.

Species	Acute/ Chronic	TRV	Reference	Notes
Arroyo Toad_AQ	Acute	6.0 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the boreal toad
Arroyo Toad_AQ	Chronic	0.6 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the boreal toad
California Red-legged Frog_AQ	Acute	6.0 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the boreal toad
California Red-legged Frog_AQ	Chronic	0.6 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the boreal toad
California Tiger Salamander_AQ	Acute	6.0 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the boreal toad
California Tiger Salamander_AQ	Chronic	0.6 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the boreal toad
Foothill Yellow-legged Frog_AQ	Acute	6.0 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the boreal toad
Foothill Yellow-legged Frog_AQ	Chronic	0.6 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the boreal toad
Southern Torrent Salamander_AQ	Acute	6.0 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the boreal toad
Southern Torrent Salamander_AQ	Chronic	0.6 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the boreal toad
Western Spadefoot_AQ	Acute	6.0 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the boreal toad
Western Spadefoot_AQ	Chronic	0.6 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the boreal toad
Black Abalone	Acute	1.89 µg/L	USEPA, 2005x	TRV based on the 1/20th LC50 in the coot clam
Black Abalone	Chronic	0.189 µg/L	USEPA, 2005x	TRV based on the 1/200th LC50 in the coot clam
California Freshwater Shrimp	Acute	2.79 µg/L	USEPA, 2005x	TRV based on the 1/20th LC50 in the amphipod
California Freshwater Shrimp	Chronic	10 µg/L	USEPA, 2005x	TRV based on the average chronic value
Mimic Tryonia	Acute	1.89 µg/L	USEPA, 2005x	TRV based on the 1/20th LC50 in the coot clam
Mimic Tryonia	Chronic	0.189 µg/L	USEPA, 2005x	TRV based on the 1/200th LC50 in the coot clam
Shasta Crayfish	Acute	2.79 µg/L	USEPA, 2005x	TRV based on the 1/20th LC50 in the amphipod
Shasta Crayfish	Chronic	10 µg/L	USEPA, 2005x	TRV based on the average chronic value
Tomales Isopod	Acute	2.79 µg/L	USEPA, 2005x	TRV based on the 1/20th LC50 in the amphipod
Tomales Isopod	Chronic	10 µg/L	USEPA, 2005x	TRV based on the average chronic value
Vernal Pool Fairy Shrimp	Acute	2.79 µg/L	USEPA, 2005x	TRV based on the 1/20th LC50 in the amphipod
Vernal Pool Fairy Shrimp	Chronic	10 µg/L	USEPA, 2005x	TRV based on the average chronic value
Arroyo Chub	Acute	7.94 µg/L	USEPA, 2000x	TRV based on the 1/20th LC50 in the fathead minnow
Arroyo Chub	Chronic	7.4 µg/L	USEPA, 2005x	TRV based on the average chronic value
Chinook Salmon--Central Valley spring-run ESU	Acute	7.0 µg/L	USEPA, 2005x	TRV based on the 1/20th LC50 in the Lahontan cutthroat trout
Chinook Salmon--Central Valley spring-run ESU	Chronic	6.0 µg/L	USEPA, 2005x	TRV based on the average chronic value

Table Eco-D-3. Toxicity Reference Values for Nonylphenol (continued).

Species	Acute/ Chronic	TRV	Reference	Notes
Coastal Cutthroat Trout	Acute	7.0 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the Lahontan cutthroat trout
Coastal Cutthroat Trout	Chronic	6.0 µg/L	USEPA, 2005x	TRV based on the average chronic value
Delta smelt	Acute	0.85 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the winter flounder
Delta smelt	Chronic	0.085 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the winter flounder
Desert Pupfish	Acute	7.94 µg/L	USEPA, 2000x	TRV based on the 1/20th LC50 in the fathead minnow
Desert Pupfish	Chronic	7.4 µg/L	USEPA, 2005x	TRV based on the average chronic value
Sacramento splittail	Acute	0.85 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the winter flounder
Sacramento splittail	Chronic	0.085 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the winter flounder
Tidewater Goby	Acute	0.85 µg/L	USEPA, 2005x	TRV based on the 1/20th LC_{50} in the winter flounder
Tidewater Goby	Chronic	0.085 µg/L	USEPA, 2005x	TRV based on the 1/200th LC_{50} in the winter flounder
American Badger	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
American Badger	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study
Big Free-tailed Bat	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
Big Free-tailed Bat	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study
Mule Deer	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
Mule Deer	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study
Nelson's Antelope Squirrel	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
Nelson's Antelope Squirrel	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study
Northwestern San Diego Pocket Mouse	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
Northwestern San Diego Pocket Mouse	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study
Riparian brush rabbit	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
Riparian brush rabbit	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study
Southern (Ramona) Grasshopper Mouse	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
Southern (Ramona) Grasshopper Mouse	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study
southern sea otter	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
southern sea otter	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study
Southwestern River Otter	Acute	120 mg/kg	EU, 2002b	TRV based on 1/10th the LD50 in the rat
Southwestern River Otter	Chronic	15 mg/kg	EU, 2002b	TRV based on the NOEL in 2-year rat reproduction study

Appendix Eco-E. Program Material Data Sheet (PMDS).

Appendix 3A

California Department of Food & Agriculture Program Material Data Sheet (PMDS) Version 2.0

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
3.) Please refer to the Example PMDS (attached) to ensure the template has been filled in properly.
4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **S. Veling** Date: 7/22/16

X Reviewed, X Revised, ☐ Approved by:
(Blankinship):**J. Sullivan** Date: 9/30/2016

☐Reviewed, ☐ Revised, ☐ Approved by:
(CDFA): Date:

☐ Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **10/26/16**

☐Reviewed, ☐ Revised, X Approved by:
(CDFA): C. Hanes Date: 10/28/16

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship):J. Sullivan Date: 11/2/16

Scenario Name: PDCP-64

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Safari 20 SG	No	Dinotefuran	None	NA

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Small, Medium and Most Large Production Nursery	Containerized nursery stock on loading dock	Statewide

Trapping Scenario (if yes, Describe below)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, backpack, etc.)
Loading dock surface (concrete, soil)	Foliar spray	Mechanically pressurized sprayer, hydraulic sprayer, backpack sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Product Application Rate	Final Tank Mix Applied (Volume per Area)
150	2 days	8 oz. per 100 gal. of water	100 gallons/20,000 sq. ft.

Application Area	Area Treated/Applicator/Day	Initial Application (Provide Month)	Final Application (Provide Month)
3750 sq. ft.	3750 sq. ft.	January	December

Months When Applications Could Occur (Place an "x" in all appropriate boxes)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
x	x	x	x	x	x	x	x	x	x	x	x

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
No Foam B	16 fl. oz.	fl. oz. per 100 gallon tank mix

Appendix 3A
Program Material Data Sheet (PMDS) Version 2.0

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Each plant receives a single application on loading dock immediately prior to shipment
- Re-entry signs are posted around treated plants.
- Plants are not loaded onto shipping trucks until the REI period has elapsed.
- Loading consist of either palleted plants or individuals pots manually lifted.
- Nursery food crops that are potential hosts can be included but would need to be treated at a lower rate.
- Treated host plants on loading docks are isolated from other nursery stock or other nontarget plants.
- Applications not be made when target plants within the application area are in bloom when bees are present.
- Applying 8 oz (by weight) of Safari 20 SG/100 gallons/20,000 sq. ft. converts to 0.22 lb. a.i./ac.
- No Foam B is applied at a rate of 16 fl. Oz./100 gallons.
- Minimize exposure of this Safari 20 SG to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of Safari 20 SG to beehives or to off-site pollinator attractive habitat.

Appendix 3A

California Department of Food & Agriculture Program Material Data Sheet (PMDS) Version 2.0

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
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4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **S. Veling** Date: 7/22/16

X Reviewed, X Revised, ☐ Approved by:
(Blankinship):**J. Sullivan** Date: 9/30/2016

☐Reviewed, ☐ Revised, ☐ Approved by:
(CDFA): Date:

☐ Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **10/26/16**

☐Reviewed, ☐ Revised, X Approved by:
(CDFA): C. Hanes Date: 10/28/16

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship): J. Sullivan Date: 11/2/16

Scenario Name: PDCP-65

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Safari 20 SG	No	Dinotefuran	None	NA

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Small, Medium and Most Large Production Nursery	Containerized nursery stock	Statewide

Trapping Scenario (if yes, Describe below)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, backpack, etc.)
Drift to nontarget containerized plants and overspray to soil or gravel	Foliar spray	Mechanically pressurized sprayer, hydraulic sprayer, boom sprayer, backpack sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Product Application Rate	Final Tank Mix Applied (Volume per Area)
2	90 days	8 oz. per 100 gal. of water	100 gallons/20,000 sq. ft.

Application Area	Area Treated/Applicator/Day	Initial Application (Provide Month)	Final Application (Provide Month)
0.75 acres	0.75 acres	January	December

Months When Applications Could Occur (Place an "x" in all appropriate boxes)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
x	x	x	x	x	x	x	x	x	x	x	x

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
No Foam B	16 fl. oz. per 100 gallons	100 gal tank mix/20,000 sq. ft.

Appendix 3A

Program Material Data Sheet (PMDS) Version 2.0

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Hold treatments are made when the nursery has a viable GWSS find in a shipment at destination. This would be a nursery with either an infested premise or a free-from premise compliance agreement. The second situation is a nursery in an infested county with trap finds that are over the maximum threshold for finds in the nursery. If either situation happens the nursery must treat all plants within 100 feet of the finds, or the block of plants where the GWSS-infested plant originated.
- Plants can be treated no more than 2x per year.
- Re-entry signs are posted around treated plants.
- Applications not be made when target or nontarget plants within the application area are in bloom.
- Applying 8 oz (by weight) of Safari 20 SG/100 gallons/20,000 sq. ft. converts to 0.22 lb. a.i./ac.
- No Foam B is applied at a rate of 16 fl. oz./100 gallons.
- Minimize exposure of this Safari 20 SG to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of Safari 20 SG to beehives or to off-site pollinator attractive habitat.

Appendix 3A

California Department of Food & Agriculture Program Material Data Sheet (PMDS) Version 2.0

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
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5.) Include units as needed.
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PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **S. Veling** Date: 7/22/16

X Reviewed, X Revised, ☐ Approved by:
(Blankinship):**J. Sullivan** Date: 9/30/2016

☐Reviewed, ☐ Revised, ☐ Approved by:
(CDFA): Date:

☐ Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **11/1/16**

☐Reviewed, ☐ Revised, X Approved by:
(CDFA): C. Hanes Date: 11/1/16

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship):J. Sullivan Date: 11/2/16

Scenario Name: PDCP-66

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Safari 20 SG	No	Dinotefuran	None	NA

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Large Production Nursery	Containerized nursery stock	Statewide

Trapping Scenario (if yes, Describe below)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, backpack, etc.)
Soil, drift to nontarget nursery plants	Foliar spray	Mechanically pressurized sprayer, hydraulic sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Product Application Rate	Final Tank Mix Applied (Volume per Area)
1	Per year	8 oz. per 100 gal. of water	100 gallons/20,000 sq. ft.

Application Area	Area Treated/Applicator/Day	Initial Application (Provide Month)	Final Application (Provide Month)
130 acres	50 acres	January	December

Months When Applications Could Occur (Place an "x" in all appropriate boxes)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
x	x	x	x	x	x	x	x	x	x	x	x

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
No Foam B	16 fl. oz./100 gallons	fl. oz. per 100 gallons

Appendix 3A

Program Material Data Sheet (PMDS) Version 2.0

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Board treatments occur where nurseries, if they meet specific requirements, can receive a pesticide treatment that is reimbursed by the CDFA PD/GWSS Board. Quite often these treatments involve the aerial application of a pesticide having systemic properties. The average size of these nurseries over the past few years has been about 130 acres. Treatments using Safari 20 SG are done at most once a year, with 12 nurseries qualifying. The products used for these treatments are those listed on the nursery PMDS as being applied using “aerial” or “soil treatment” methods.
- Plants can be treated no more than once per year.
- Re-entry signs are posted around treated plants. Applications not be made when target or nontarget plants within the application area are in bloom.
- Applying 8 oz (by weight) of Safari 20 SG/100 gallons/20,000 sq. ft. converts to 0.22 lb. a.i./ac.
- No Foam B is applied at a rate of 16 oz/100 gallons.
- Minimize exposure of this Safari 20 SG to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of Safari 20 SG to beehives or to off-site pollinator attractive habitat.

Appendix 3A

California Department of Food & Agriculture Program Material Data Sheet (PMDS) Version 2.0

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
3.) Please refer to the Example PMDS (attached) to ensure the template has been filled in properly.
4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **S. Veling** Date: 7/22/16

X Reviewed, ☐X Revised, ☐ Approved by:
(Blankinship):**J. Sullivan** Date: 10/3/16

☐Reviewed, ☐ Revised, ☐ Approved by:
(CDFA): Date:

☐ Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **10/18/16**

☐Reviewed, ☐ Revised, X Approved by:
(CDFA): C. Hanes Date: 10/28/16

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship): J. Sullivan Date: 11/2/16

Scenario Name: PDCP-70

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Merit 2F	No	Imidacloprid	None	NA

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Residential	Landscape host material	Statewide

Trapping Scenario (if yes, Describe below)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 Years	Various	Ornamentals

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Potential overspray to turf, bare soil, nontarget plants	Foliar	Mechanically pressurized sprayer, backpack sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Product Application Rate	Final Tank Mix Applied (Volume per Area)
Once per year per location	Once per year per location	1.5 fl oz (45mL) per 100 gal of water	100 gallons/acre

Application Area	Area Treated/Applicator/Day	Initial Application (Provide Month)	Final Application (Provide Month)
15 acres	15 acres	January	December

Months When Applications Could Occur (Place an "x" in all appropriate boxes)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
x	x	x	x	x	x	x	x	x	x	x	x

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
None	NA	NA

Appendix 3A
Program Material Data Sheet (PMDS) Version 2.0

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Applications made in a 150 m radius around a find.
- Applications made to ornamental.
- No applications made to citrus or vegetables, but other fruit trees could be treated.
- No direct applications made to turf.
- Lawn furniture, lawn toys, are removed or covered.
- Water containers and features are tarped or covered.
- Application rate of 1.5 fl. oz. Merit/100 gal tank mix, and 100 gal tank mix/Ac is 0.023 lb imidacloprid/Ac.
- Overspray to impervious surfaces avoided.
- Pre-treatment notification of 7 days provided to all properties.
- Residents are provided notices regarding re-entry period of “once the spray has dried.”
- Notices also indicate citrus fruits and grapes can be eaten directly after treatment as long as they are washed. Preharvest intervals for other fruits that might be treated are also provided.
- Minimize exposure of Merit 2F to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of Merit 2F to beehives or to off-site pollinator attractive habitat.

Appendix 3A

California Department of Food & Agriculture Program Material Data Sheet (PMDS) Version 2.0

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
3.) Please refer to the Example PMDS (attached) to ensure the template has been filled in properly.
4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **S. Veling** Date: 7/22/16

X Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: 10/3/16

☐Reviewed, ☐ Revised, ☐ Approved by:
(CDFA): Date:

☐ Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **10/18/16**

☐Reviewed, ☐ Revised, X Approved by:
(CDFA): C. Hanes Date: 10/28/16

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship): J. Sullivan Date: 11/2/16

Scenario Name: PDCP-71

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Merit 2F	Yes	Imidacloprid	None	NA

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Residential	Landscape host material	Statewide

Trapping Scenario (if yes, Describe below)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Ornamentals including groundcovers and citrus and other fruit trees

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
turf and soil	Drench	Mechanically pressurized sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Product Application Rate	Final Tank Mix Applied (Volume per Area)
Once per year per location	Once per year per location	0.2 fl oz. per inch of trunk dia. or per foot of shrub height	NA, no more than 128 inches of tree trunk or feet of shrub height per acre

Application Area	Area Treated/Applicator/Day	Initial Application (Provide Month)	Final Application (Provide Month)
15 acres	15 acres	January	December

Months When Applications Could Occur (Place an "x" in all appropriate boxes)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
x	x	x	x	x	x	x	x	x	x	x	x

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
None	NA	NA

Appendix 3A
Program Material Data Sheet (PMDS) Version 2.0

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Section 24c for citrus leafminer provides for a 2ee recommendation for use.
- Applications made in a 150 m radius around a find.
- Applications made to ornamentals, citrus and other fruit trees.
- No applications made vegetables.
- No direct applications made to turf.
- Overspray to impervious surfaces avoided.
- Pre-treatment notification of 7 days provided to all properties.
- Residents are provided notices regarding re-entry period of “once the spray has dried.”
- Notices also indicate citrus fruits and grapes can be eaten directly after treatment as long as they are washed. Preharvest intervals for other fruits that might be treated are also provided.
- Maximum allowed amount of active ingredient is 0.4 lb a.i./acre or 1.6 pints of product. This application rate provides for treatment of 128 inches of tree trunk diameter or feet of shrub height per acre.
- Minimize exposure of Merit 2F to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.

Appendix 3A

California Department of Food & Agriculture Program Material Data Sheet (PMDS) Version 2.0

PMDS Status Summary

Prepared by
(CDFA): **S. Veling** Date: 7/22/16

X Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: 10/3/16

☐Reviewed, ☐ Revised, ☐ Approved by:
(CDFA): Date:

☐ Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **10/18/16**

☐Reviewed, ☐ Revised, x Approved by:
(CDFA): C. Hanes Date: 10/28/16

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship): J. Sullivan Date: 11/1/16

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
3.) Please refer to the Example PMDS (attached) to ensure the template has been filled in properly.
4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

Scenario Name: PDCP-72

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Merit 2F	Yes	Imidacloprid	None	NA

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Residential	Landscape host material	Statewide

Trapping Scenario (if yes, Describe below)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 Years	Various	Ornamentals including groundcovers and citrus and other fruit trees

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Soil and turf	Injection	Soil Injector

Application(s) per year	Application Interval (If variable, explain on page 2)	Product Application Rate	Final Tank Mix Applied (Volume/Area)
Once per year per location	Once per year per location	0.2 fl oz. per inch of trunk dia. or per foot of shrub height	NA, no more than 128 inches of tree trunk or feet of shrub height per acre

Application Area	Area Treated/Applicator/Day	Initial Application (Provide Month)	Final Application (Provide Month)
15 acres	15 acres	January	December

Months When Applications Could Occur (Place an "x" in all appropriate boxes)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
x	x	x	x	x	x	x	x	x	x	x	x

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
None	NA	NA

Appendix 3A

Program Material Data Sheet (PMDS) Version 2.0

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Section 24c for citrus leafminer provides for a 2ee recommendation for use.
- Applications made in a 150 m radius around a find.
- Applications made to ornamentals, citrus and other fruit trees.
- No applications made vegetables.
- No direct applications made to turf.
- Pre-treatment notification of 7 days provided to all properties.
- Residents are provided notices regarding re-entry period of “once the spray has dried.”
- Notices also indicate citrus fruits and grapes can be eaten directly after treatment as long as they are washed. Preharvest intervals for other fruits that might be treated are also provided.
- Maximum allowed amount of active ingredient is 0.4 lb a.i./acre or 1.6 pints of product. This application rate provides for treatment of 128 inches of tree trunk diameter or feet of shrub height per acre.
- Minimize exposure of Merit 2F to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.

Appendix 3A

California Department of Food & Agriculture
Program Material Data Sheet (PMDS) Version 2.0

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
3.) Please refer to the Example PMDS (attached) to ensure the template has been filled in properly.
4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **C. Hanes** Date: 10/14/16

X Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: 10/14/16

☐Reviewed, X Revised, ☐ Approved by:
(CDFA): **C. Hanes** Date: 10/31/16

☐ Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **11/1/16**

☐Reviewed, ☐ Revised, X Approved by:
(CDFA): C. Hanes Date: 11/2/16

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship): J. Sullivan Date: 11/2/16

Scenario Name: PDCP-77

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Marathon II Greenhouse and Nursery Insecticide	No	Imidacloprid	None	None

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Small, Medium, and Most Large Production Nursery	Containerized nursery stock on loading dock	Statewide

Trapping Scenario (if yes, Describe below)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Loading dock surface (concrete, soil)	Foliar spray	Mechanically pressurized sprayer, backpack sprayer, or hydraulic sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Product Application Rate	Final Tank Mix Applied
150	2 days	1.7 fl oz. per 100 gal. of water	100 gallons/acre

Application Area	Area Treated/Applicator/Day	Initial Application (Provide Month)	Final Application (Provide Month)
3750 square feet	3750 square feet	January	December

Months When Applications Could Occur (Place an "x" in all appropriate boxes)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
x	x	x	x	x	x	x	x	x	x	x	x

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
No Foam B	16 fl oz/100 gal tank mix	100 gallons/acre

Appendix 3A

Program Material Data Sheet (PMDS) Version 2.0

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Each plant receives a single application on loading dock immediately prior to shipment
- Re-entry signs are posted around treated plants.
- Plants are not loaded onto shipping trucks until the REI period has elapsed.
- Loading consist of either palleted plants or individuals pots manually lifted.
- Nursery food crops that are potential hosts can be include
- ed.
- Consistent with assumptions made in the Statewide PEIR analysis for other imidacloprid-containing products applied in nurseries, assume 100 gallons of tank mix are sprayed per acre.
- Applying 1.7 fl. oz./100 gallons/acre results in application rate of 0.027 lb a.i./acre.
- Application rate for No Foam B is 16 fl. oz./100 gallons of tank mix.
- Treated host plants on loading docks are isolated from other nursery stock or other nontarget plants.
- Applications will not be made when target plants within the application area are in bloom.
- Do not apply Marathon II Greenhouse and Nursery Insecticide or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

Appendix 3A

California Department of Food & Agriculture Program Material Data Sheet (PMDS) Version 2.0

INSTRUCTIONS:

1.) Please fill in this PMDS with specific application scenario details.
2.) In the "Application Description" section on Page 2, please describe the application in thorough detail.
3.) Please refer to the Example PMDS (attached) to ensure the template has been filled in properly.
4.) Please attach product label and Safety Data Sheet.
5.) Include units as needed.
6.) For PMDS revisions, do so in track changes and "save as" with the following file naming convention:
PMDS Program Name Pesticide Scenario App Method Author Initials Date
Ex.: PMDS JB Acelepryn Turf Spray Drench LP 4.2.16

PMDS Status Summary

Prepared by
(CDFA): **C. Hanes** Date: 10/14/16

X Reviewed, X Revised, ☐ Approved by:
(Blankinship):**J. Sullivan** Date: 10/20/16

☐Reviewed, x Revised, ☐ Approved by:
(CDFA): **C. Hanes** Date: 10/31/16

☐ Reviewed, X Revised, ☐ Approved by:
(Blankinship): **J. Sullivan** Date: **11/1/16**

☐Reviewed, ☐ Revised, X Approved by:
(CDFA): C. Hanes Date: 11/2/16

☐Reviewed, ☐ Revised, X Approved by:
(Blankinship): J. Sullivan Date: 11/2/16

Scenario Name: PDCP-78

Product Name	Specialty Label (e.g., Section 18, 24c) (Yes/No)	Active Ingredient(s)	Additional Product	Additional Active Ingredient
Marathon II Greenhouse and Nursery Insecticide	No	Imidacloprid	None	None

General Scenario Setting (e.g., Large Production Nursery, Residential, etc.)	Specific Scenario Setting Description (e.g., containerized plants on loading dock)	Geographic Scenario Setting Description (Statewide or specific region)
Small, Medium, and Most Large Production Nursery	Containerized nursery stock	Statewide

Trapping Scenario (if yes, Describe below)	Anticipated Consecutive Years of Application	Target Pest(s)	Target Host(s) (e.g., citrus tree, ornamental, turf, etc.)
N/A	Minimum of 4 years	Various	Nursery stock

Non-target Areas Affected (e.g., potential overspray to turf)	Application Technique (e.g., broadcast, drench, spot spray, etc.)	Application Equipment (e.g., mechanically pressurized handgun, boom sprayer, etc.)
Soil and non-target plants	Foliar spray	Mechanically pressurized sprayer, backpack sprayer, or hydraulic sprayer

Application(s) per year	Application Interval (If variable, explain on page 2)	Product Application Rate	Final Tank Mix Applied
2	180 days	1.7 fl oz. per 100 gal. of water	100 gallons/acre

Application Area	Area Treated/Applicator/Day	Initial Application (Provide Month)	Final Application (Provide Month)
0.75 Acre	0.75 Acre	January	December

Months When Applications Could Occur (Place an "x" in all appropriate boxes)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
x	x	x	x	x	x	x	x	x	x	x	x

Adjuvant(s) or Additive(s) Product:	Adjuvant Application Rate	Adjuvant Application Rate Units
No Foam B	16 fl oz/100 gal tank mix	100 gallons/acre

Appendix 3A

Program Material Data Sheet (PMDS) Version 2.0

Application Descriptions and Assumptions (Please describe the application in as much detail as possible using a bullet point list).

- Hold treatments are made when the nursery has a viable GWSS find in a shipment at destination. This would be a nursery with either an infested premise or a free-from premise compliance agreement. The second situation is a nursery in an infested county with trap finds that are over the maximum threshold for finds in the nursery. If either situation happens the nursery must treat all plants within 100 feet of the finds, or the block of plants where the GWSS-infested plant originated.
- The same plants can be treated more than one time per year.
- Re-entry signs are posted around treated plants.
- Consistent with assumptions made in the Statewide PEIR analysis for other imidacloprid-containing products applied in nurseries, assume 100 gallons of tank mix are sprayed per acre.
- Applying 1.7 fl. oz./100 gallons/acre results in application rate of 0.027 lb a.i./acre.
- Application rate for No Foam B is 16 fl. oz./100 gallons of tank mix.
- Treated host plants on loading docks are isolated from other nursery stock or other nontarget plants.
- Applications will not be made when target plants within the application area are in bloom.
- Do not apply Marathon II Greenhouse and Nursery Insecticide or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

Appendix 3A

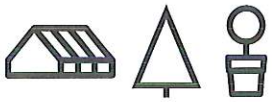
Labels and Safety Data Sheets (SDS) for Application Scenarios:

PDCP-64, PDCP-65, PDCP-66, PDCP-66 Aerial, PDCP-70, PDCP-71, PDCP-72, PDCP-77, and PDCP-78

Appendix 3A

GROUP	4A	INSECTICIDE

Safari®
20 SG INSECTICIDE



FOR FOLIAR AND SYSTEMIC INSECT CONTROL IN ORNAMENTAL PLANTS AND VEGETABLE TRANSPLANTS IN ENCLOSED STRUCTURES.

FOR GREENHOUSE, NURSERY, INTERIOR PLANTSCAPE, OUTDOOR LANDSCAPE AND FORESTRY USE ONLY.

Active Ingredient:	
Dinotefuran, [N-methyl-N'-nitro-N"-((tetrahydro-3-furanyl)methyl)guanidine]	20%
Other Ingredients.....	80%
Total	100%

EPA Reg. No. 86203-11-59639 EPA Est. 67545-AZ-01

KEEP OUT OF REACH OF CHILDREN
CAUTION
SEE BELOW FOR ADDITIONAL PRECAUTIONARY STATEMENTS.

FIRST AID

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for further treatment advice.

If swallowed: Call poison control center or doctor immediately for treatment advice. Do not induce vomiting unless told to do so by the poison control center or doctor. Have person sip a glass of water if able to swallow. Do not give anything by mouth to an unconscious person.

(continued)

FIRST AID (continued)

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for further treatment advice.

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call poison control center or doctor for further treatment advice.

HOT LINE NUMBER

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact **800-892-0099** for emergency medical treatment information.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION

Harmful if swallowed or absorbed through skin. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Causes moderate eye irritation. Remove and wash contaminated clothing before reuse.

PERSONAL PROTECTIVE EQUIPMENT (PPE):

Applicators and other handlers must wear:
- Long-sleeved shirt and long pants
- Shoes plus socks

USER SAFETY REQUIREMENTS

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions exist for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users should:
- Wash hands with soap and water before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not apply when weather conditions favor drift from treated areas. Drift and runoff from treated areas may be hazardous to aquatic organisms in water adjacent to treated areas. Do not dispose equipment washwaters or rinsate into a natural drain or water body.

This product is toxic to honey bees. The persistence of residues and potential residual toxicity of dinotefuran in nectar and pollen suggests the possibility of chronic toxic risk to honey bee larvae and the eventual instability of the hive.

- This product is toxic to bees exposed to residues for more than 38 hours following treatment.
- Do not apply this product to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period, unless the application is made in response to a public health emergency declared by appropriate state or federal authorities.

Dinotefuran and its degradate, MNG, have the properties and characteristics associated with chemicals detected in groundwater. The high water solubility of dinotefuran, and its degradate, MNG, coupled with its very high mobility, and resistance to biodegradation indicates that this compound has a strong potential to leach to the subsurface under certain conditions as a result of label use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

PHYSICAL OR CHEMICAL HAZARDS

Do not use, pour, spill or store near heat or open flame.

SPRAY DRIFT ADVISORY

Do not apply under conditions involving possible drift to food, forage or other plantings that might be damaged or the crop thereof rendered for sale, use or consumption.

PROTECTION OF POLLINATORS

APPLICATION RESTRICTIONS EXIST FOR THIS PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT POLLINATORS.

(continued)

PROTECTION OF POLLINATORS (continued)

Look for the bee hazard icon in the Directions for Use for each application site for specific use restrictions and instructions to protect bees and other insect pollinators.

This product can kill bees and other insect pollinators.

Bees and other insect pollinators will forage on plants when they flower, shed pollen or produce nectar.

Bees and other insect pollinators can be exposed to this pesticide from:

- Direct contact during foliar applications, or contact with residues on plant surfaces after foliar applications.
- Ingestion of residues in nectar and pollen when the pesticide is applied as a seed treatment, soil, tree injection, as well as foliar applications.

When Using This Product Take Steps To:

- Minimize exposure of this product to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of this product on to beehives or to off-site pollinator attractive habitat. Drift of this product onto beehives or off-site to pollinator attractive habitat can result in bee kills.

Information on protecting bees and other insect pollinators may be found at the Pesticide Environmental Stewardship website at: http://pesticidestewardship.org/PollinatorProtection/Pages/default.aspx. Pesticide incidents (for example, bee kills) should immediately be reported to the State/Tribal lead agency. For contact information for your State, go to: www.aapco.org. Pesticide incidents should also be reported to the National Pesticide Information Center at: www.npic.orst.edu or directly to EPA at: beekill@epa.gov.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

READ ENTIRE LABEL. USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

FOR COMMERCIALLY GROWN ORNAMENTALS NOT UNDER CONTRACT FOR POLLINATION SERVICES BUT ARE ATTRACTIVE TO POLLINATORS

- **Do not apply this product while bees are foraging.**
- **This product is toxic to bees exposed to residue for more than 38 hours following treatment.**
- **Do not apply this product to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period, unless the application is made in response to a public health emergency declared by appropriate state or federal authorities.**

NON-AGRICULTURAL USES

Do not apply Safari® 20 SG Insecticide while bees are foraging. Do not apply *Safari* 20 SG Insecticide to plants that are flowering. Only apply after all flower petals have fallen off.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, greenhouses and handlers of agricultural insecticides. It contains requirements for training, decontamination, notification and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

EXCEPTION: If product is drenched or soil-injected, workers may enter the area at any time if there will be no contact with anything that has been treated.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil or water is:

- Coveralls
- Shoes plus socks
- Chemical-resistant gloves (made of any waterproof material)

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Do not allow others to enter treated areas until sprays have dried.

APPLICATION INFORMATION

- Applications of *Safari* 20 SG Insecticide in residential areas may be made by commercially licensed applicators.

Application to Ornamental Plants (including Forestry):

- *Safari* 20 SG Insecticide can be applied as a foliar spray, a broadcast spray, a soil drench, soil injection and via chemigation for insect control in ornamental plants in greenhouses, nurseries, outdoor landscapes and interior plantscapes.
- *Safari* 20 SG Insecticide is a systemic product and will be taken up by the root system and translocated upward throughout the plant. When applied as a foliar spray, the product offers translaminar and locally systemic control of foliar pests.
- When applied to the soil, *Safari* 20 SG Insecticide will be translocated more quickly in herbaceous plants than in woody shrubs and trees. Speed of insect control will range from as little as one day for small herbaceous plants in containers, to several weeks in large trees growing in the landscape.
- Do not apply more than a total of 2.7 lbs of product (0.54 lb active ingredient) per acre per year for all application types.
- **Do not apply this product, by any application method, to linden, basswood or other *Tilia* species.**

Application to Vegetable Transplants:

- *Safari* 20 SG Insecticide can be applied as a foliar spray or a broadcast spray for insect control in vegetable transplants.
- Do not apply more than 1.34 lbs (0.268 lbs ai) per acre of nursery per year.

MIXING INSTRUCTIONS:

Safari 20 SG Insecticide Alone: Add half of the required amount of water to the mix tank. With the agitator running, add the desired amount of *Safari* 20 SG Insecticide to the tank. Continue agitation while adding the remainder of the water. Begin application of the solution after *Safari* 20 SG Insecticide has completely dispersed into the mix water. Maintain agitation until all of the mixture has been applied.

Safari 20 SG Insecticide + Tank Mixtures: Add half of the required amount of water to the mix tank. Start the agitator running before adding any tank mix partners. In general, add tank mix partners in this order: products packaged in water-soluble packaging, wettable powders, wettable granules (dry flowables), liquid flowables, liquids, emulsifiable concentrates, and surfactants/adjuvants. Always allow each tank

mix partner to become fully dispersed before adding the next product. Provide sufficient agitation while adding the remainder of the water. Maintain agitation until all the mixture has been applied.

NOTE: When using *Safari* 20 SG Insecticide in tank mixtures, add all products in water-soluble packaging to the tank before any other tank mix partner, including *Safari* 20 SG Insecticide. Allow the water-soluble packaging to completely dissolve and the product(s) to completely disperse before adding any other tank mix partner to the tank.

If using *Safari* 20 SG Insecticide in a tank mixture, observe all directions for use, crop/sites, use rates, dilution ratios, precautions, and limitations which appear on the tank mix product label. Do not exceed label dosage rate, and follow the most restrictive label precautions and limitations. Do not mix this product with any product that prohibits such mixing. Tank mixtures or other applications of products referenced on this label are permitted only in those states in which the referenced products are labeled.

Compatibility

IMPORTANT: The safety of all potential tank mixes has not been tested on all crops. Before applying any tank mixture not specifically listed on this label, confirm the safety to the target crop.

Safari 20 SG Insecticide is compatible with most commonly used pesticides, crop oils, adjuvants, and nutritional sprays. However, since it is not possible to test all possible mixtures, pre-test to assure the physical compatibility and lack of phytotoxic effect of any proposed mixtures with *Safari* 20 SG Insecticide. To determine the physical compatibility of *Safari* 20 SG Insecticide with other products, use a jar test, as described below:

Using a quart jar, add the proportionate amounts of the products to 1 quart of water. Add wettable powders and water dispersible granular products first, then liquid flowables, and emulsifiable concentrates last. After thoroughly mixing, let stand for at least 5 minutes. If the combination remains mixed or can be remixed readily, it is physically compatible. Once compatibility has been proven, use the same procedure for additional required ingredients to the spray tank.

RESISTANCE MANAGEMENT

Safari 20 SG Insecticide contains a Group 4A insecticide. Insect biotypes with acquired resistance to Group 4A may eventually dominate the insect population if Group 4A insecticides are used repeatedly in the same crop or in successive years as the primary method of control for a targeted species. This may result in partial or total loss of control of those species by *Safari* 20 SG Insecticide or other Group 4A insecticides.

To delay the development of insecticide resistance in greenhouse, nursery and interiorscape use sites, strongly consider the following guidelines:

- Do not apply *Safari* 20 SG Insecticide or other Group 4A insecticides to consecutive generations of the same insect pest species.
- Do not drench soil media with *Safari* 20 SG Insecticide or other Group 4A insecticides more than one time per crop cycle or three months, whichever is shorter.
- Do not make more than two foliar or broadcast sprays of *Safari* 20 SG Insecticide or other Group 4A insecticides to a single crop during a two-month period.
- Do not make more than one soil drench and one foliar or broadcast spray with *Safari* 20 SG Insecticide or other Group 4A insecticides during a two-month period.
- Base insecticide use on a comprehensive IPM program.
- Monitor treated insect populations for loss of field efficacy.
- Contact your local extension specialist, certified crop advisors, and/or manufacturers for insecticide resistance management and/or IPM guidelines for the specific site and resistant pest problems.
- For further information or to report suspected resistance, you may contact Valent U.S.A. Corporation, at toll free number: 1-800-898-2536.

APPLICATION PROCEDURES AND SPRAY EQUIPMENT

Ground Application: Select spray nozzles that will provide accurate and uniform spray deposition. Use spray nozzles that provide medium-sized droplets and reduce drift. To help insure accuracy, calibrate sprayer before each use. For information on spray equipment and calibration, consult nozzle manufacturers and/or State Extension Service specialists.

Apply *Safari* 20 SG Insecticide using sufficient water volume to provide thorough and uniform coverage. In situations where a dense canopy exists and/or pest pressure is high, use greater water volumes. The use of a spray adjuvant may improve spray coverage. Do not apply under conditions where uniform coverage cannot be obtained or where excessive spray drift may occur.

Applications to ornamental plants, forestry and vegetable transplants: *Safari* 20 SG Insecticide can be

applied using many different types of application equipment. Apply in sufficient water to ensure good coverage of ornamental plants. Tank mixing with a surfactant will produce better coverage when making applications to plants with hard to wet foliage such as holly or pine. If concentrate or mist type spray equipment is used, apply the same amount of product on the sprayed area as would be used in a dilute solution. To assure optimum effectiveness, the product must be placed where the growing portion of the target plant can absorb the active ingredient. Applications can be made to foliage or as a soil drench.

RESTRICTIONS

- With the exception of non-livestock animals, do not graze treated areas or use clippings from treated areas for feed or forage.
- Prevent runoff or puddling of irrigation water following application.
- Keep children and pets off treated areas until spray has dried.
- Do not apply to areas that are water logged or saturated, or frozen, which will not allow penetration into the root zone of the plant.

APPLICATION THROUGH IRRIGATION SYSTEMS (CHEMIGATION):

Safari 20 SG Insecticide may be applied by injection into an irrigation system, either alone or in combination with other pesticides or chemicals that are registered for application through irrigation systems. Dilution ratios are normally 1:100 to 1:200, depending on the system. Apply this product only through microirrigation (individual spaghetti tube), drip irrigation, overhead irrigation, or motorized calibrated irrigation equipment (Ornamentals). Do not apply through any other type of irrigation system. Lack of effectiveness can result from non-uniform distribution of treated water. If you have questions about calibration, contact State Extension Service specialists, equipment manufacturers, or other experts. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make adjustments when necessary.

Using Water from Public Water Systems:
DO NOT APPLY *Safari* 20 SG INSECTICIDE THROUGH ANY IRRIGATION SYSTEM PHYSICALLY CONNECTED TO A PUBLIC WATER SYSTEM.

Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days per year. *Safari* 20 SG Insecticide may be applied through irrigation systems which may be supplied by a public water system only if the water from the public water system is discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and to top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe. Before beginning chemigation, always make sure that the air gap exists and that there is no blockage of the overflow of the reservoir tank.

Any irrigation system using water supplied from a public water system must also meet the following requirements:

Operating Instructions for Irrigation Systems:

1. The system must be calibrated to uniformly apply the rates specified. If you have questions about calibration, contact State Extension Service specialists, equipment manufacturers, or other experts.
2. The system must contain a functional check valve, vacuum relief valve, and low-pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
3. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
4. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
5. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
6. The irrigation line or water pump must include a functional pressure switch that will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
7. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
8. Do not apply when wind speed favors drift beyond the area intended.

Calibration and Application Instructions:

Apply *Safari* 20 SG Insecticide under the schedule specified in the specific use instructions, not according to the irrigation schedule unless the events coincide. In general, set the equipment to apply the minimum amount of water per acre. Run the system at 86-90% of the manufacturer's maximum rated travel speed.

The following calibration and application techniques are provided for user reference, but do not constitute a warranty of fitness for application through sprinkler irrigation equipment. Check with State and local regulatory agencies for potential use restrictions before applying any agricultural chemical through sprinkler irrigation equipment.

Appendix 3A

MINIMIZING SPRAY DRIFT

As with all crop protection products, it is important to minimize off-target movement. Do not allow spray to drift onto adjacent land, crops, or aquatic areas. To minimize spray drift:

1. Make applications when wind velocity favors on-target product deposition (approximately 3 to 10 mph). Do not apply when wind velocity exceeds 10 mph. Do not apply when wind gusts approach 10 mph.
2. Risk of exposure to sensitive aquatic areas can be reduced by not applying when wind direction is toward the aquatic area.
3. Do not cultivate or plant crops within 25 feet of the aquatic area as to allow growth of a vegetative filter strip.
4. Do not make applications during temperature inversions. Inversions are characterized by stable air and increasing temperatures with increased height above the ground. Mist or fog may indicate the presence of an inversion in humid areas. The applicator may detect the presence of an inversion by producing smoke and observing a smoke layer near the ground surface.
5. Use the largest droplet size consistent with good pest control. Small droplets are more prone to spray drift and can be minimized by appropriate nozzle selection, by orienting nozzles away from the air stream as much as possible, and by not using excessive spray boom pressure.
6. Apply as close to target plants as practical to obtain a good spray pattern for adequate coverage. Do not apply more than 10 ft above the crop canopy.
7. For aerial applications, mount spray boom on the aircraft so as to minimize drift caused by wing tip vortices. Use minimum practical boom length and do not use boom that exceeds 75% of wing span or rotor diameter.

Air Assisted (Air Blast) Tree and Vine Sprayers (Ornamentals Only):

Air assisted tree and vine sprayers carry droplets into the canopy of trees and vines via a radially or laterally directed air stream. In addition to the general drift management principles already described, the following specific practices will further reduce the potential for drift:

1. Adjust deflectors and aiming devices so that spray is only directed into the canopy.
2. Block off upward pointed nozzles when there is no overhanging canopy.
3. Use only enough air volume to penetrate the canopy and provide good coverage. Use a minimum of 50 gallons finished spray per acre.
4. Do not allow spray to go beyond the edge of the cultivated area. Spray the outside row only from outside the planting.

Appendix 3A

VEGETABLE TRANSPLANTS (IN ENCLOSED STRUCTURES) FOLIAR OR BROADCAST SPRAY APPLICATION
For foliar insect control on vegetable transplants grown in enclosed structures.

Crops	Pests	Product Rate (By Weight)	Remarks
Cucurbits (Transplants only) Cantaloupe Cucumber Melons Squash Fruiting Vegetables Eggplant Peppers Tomato Head and Stem Brassica Broccoli Brussels Sprouts Cabbage Cauliflower Kohlrabi	Aphids Leafminers Mealybugs Thrips (suppression) Whiteflies including: Silverleaf/ Sweetpotato (B and Q Biotypes)	3.5-7.0 oz per 100 gal 7 - 14 oz per Acre 0.16-0.32 oz per 1,000 sq ft (0.09 to 0.18 lbs ai per Acre)	Do not make more than one application per crop. Apply only to cucurbits and brassica being grown as transplants and before transplants are sold. 100 gals of spray mix will treat 20,000 sq ft of area when using a typical high volume sprayer. If using a low volume sprayer, adjust concentration to apply the same amount of product per unit area.
Leafy Vegetables (Transplants only) (Excluding *Brassica* spp.)	Aphids Leafminers Mealybugs Thrips (suppression) Whiteflies including: Silverleaf/ Sweetpotato (B and Q Biotypes)	3.5-5.5 oz per 100 gal 7-11 oz per Acre 0.16-0.25 oz per 1,000 sq ft (0.09 to 0.134 lbs ai per Acre)	Do not make more than one application per crop. Apply only to leafy vegetables being grown as transplants and before transplants are sold. 100 gals of spray mix will treat 20,000 sq ft of area when using a typical high volume sprayer. If using a low volume sprayer, adjust concentration to apply the same amount of product per unit area.

One (1) level teaspoon contains 2.4 grams and 1 cup (8 fl oz) contains 4.0 oz by weight of *Safari* 20 SG Insecticide.

Begin applications when first pest activity is noticed or when insects reach threshold levels per University/Extension recommendations. Time application before a damaging population becomes established.

Restriction:
Do not apply more than 1.34 lbs (0.268 lbs ai) per acre of nursery per year.

To delay the development of resistance: Do not apply *Safari* 20 SG Insecticide or other Group 4A insecticides to consecutive generations of the same insect species without switching to a different mode of action. Do not make more than two sprays of *Safari* 20 SG Insecticide or other Group 4A insecticides to a single crop. Refer to "Resistance Management" section of label for further guidelines.

Appendix 3A

ORNAMENTAL PLANTS AND FORESTS – FOLIAR OR BROADCAST SPRAY APPLICATION – OUTDOOR

For foliar insect control on ornamental plants in nurseries, outdoor landscapes (commercial, industrial, recreational and residential), tree plantations, reforestation nurseries and forests.

Crops	Pests	Product Rate	Remarks
Ornamental plants including: Shrubs Bedding Plants Flowering Plants Foliage Plants Ground Covers Evergreens Ornamental Trees Non-Bearing Fruit Trees Non-Bearing Nut Trees Non-Bearing Vines Christmas Trees Trees in Plantations including: Conifers Deciduous trees Reforestation Nurseries Forests and Wooded Areas: National, Private and State	Adelgids including: Hemlock Woolly, Balsam Woolly Aphids (suppression) including: Balsam, Crepe Myrtle, Green Peach Melon Japanese Beetles (adults) Lacebugs including: Azalea, Cotoneaster, Hawthorne Rhododendron Leaf Beetles, Viburnum Leafhoppers, including: Glassy-Winged Sharpshooter, Potato Leafminers including: Serpentine Mealybugs including: Citrus, Long-Tailed, Madeira, Obscure, Phormium, Pink Hibiscus Psyllids including: Asian Citrus Root Weevils (adults) including: Black Vine, Diaprepes Sawflies (larvae) Scale (Armored and Soft) including: Cryptomeria, Cycad Aulacaspis, Elongate Hemlock, Euonymus, Florida Red, Florida Wax, Tea Thrips including: Chilli, Gynaikothrips uzeli, Western Flower (suppression) Whiteflies including: Fig (Ficus), Giant, Greenhouse, Silverleaf / Sweetpotato (B and Q Biotypes)	**Foliar Spray** 1/4 to 1/2 lb per 100 gallons (4 to 8 oz per 100 gallons) (0.05 to 0.1 lbs ai per 100 gallons) 8-16 oz per Acre (0.1 to 0.2 lbs ai/A) 0.2-0.4 oz per 1,000 sq ft For treatment of small areas: 1/2-1.0 tsp per gallon	Make first application just before pest populations reach an economic threshold. If necessary, make a second application after 14-21 days. Tank mixing with a surfactant may improve control of pests such as whitefly, mealybug and scale. Confirm plant safety of tank mix in small area before using on a commercial scale. 100 gals of spray mix will treat 20,000 sq ft of area when using a typical high volume sprayer. If using a low volume sprayer, adjust concentration to apply the same amount of product per unit area.

One (1) level teaspoon contains 2.4 grams and 1 cup (8 fl oz) contains 4.0 oz by weight of *Safari* 20 SG Insecticide.

Make first application just before pest populations reach an economic threshold. If necessary, make a second application after 14-21 days.

Restrictions:
Not for use on house plants grown inside private residences.

Do not apply more than 2.7 lbs (0.54 lbs ai) per acre of nursery, landscape or forest per year.

To delay the development of resistance: Do not apply *Safari* 20 SG Insecticide or other Group 4A insecticides to consecutive generations of the same insect species without switching to a different mode of action. Do not make more than two sprays of *Safari* 20 SG Insecticide or other Group 4A insecticides to a single crop. Refer to "Resistance Management" section of label for further guidelines.

Appendix 3A

ORNAMENTAL PLANTS – FOLIAR OR BROADCAST SPRAY APPLICATION – INDOOR

For foliar insect control on ornamental plants in greenhouses, interior plantscapes, lath and shadehouses.

Crops	Pests	Product Rate	Remarks
Ornamental plants including: Shrubs Bedding Plants Flowering Plants Foliage Plants Ground Covers Evergreens Ornamental Trees Non-Bearing Fruit Trees Non-Bearing Nut Trees Non-Bearing Vines	Adelgids including: Hemlock Woolly, Balsam Woolly Aphids (suppression) including: Balsam, Crepe Myrtle, Green Peach Melon Japanese Beetles (adults) Lacebugs including: Azalea, Cotoneaster, Hawthorne Rhododendron Leaf Beetles, Viburnum Leafhoppers, including: Glassy-Winged Sharpshooter, Potato Leafminers including: Serpentine Mealybugs including: Citrus, Long-Tailed, Madeira, Obscure, Phormium, Pink Hibiscus Psyllids including: Asian Citrus Root Weevils (adults) including: Black Vine, Diaprepes Sawflies (larvae) Scale (Armored and Soft) including: Cryptomeria, Cycad Aulacaspis, Elongate Hemlock, Euonymus, Florida Red, Florida Wax, Tea Thrips including: Chilli, *Gynaikothrips uzeli*, Western Flower (suppression) Whiteflies including: Fig (Ficus), Giant, Greenhouse, Silverleaf / Sweetpotato (B and Q Biotypes)	**Foliar Spray** 1/4 to 1/2 lb per 100 gallons (4 to 8 oz per 100 gallons) (0.05 to 0.1 lbs ai per 100 gallons) 8-16 oz per Acre (0.1 to 0.2 lbs ai/A) 0.2-0.4 oz per 1,000 sq ft For treatment of small areas: 1/2-1.0 tsp per gallon	Make first application just before pest populations reach an economic threshold. If necessary, make a second application after 14-21 days. Tank mixing with a surfactant may improve control of pests such as whitefly, mealybug and scale. Confirm plant safety of tank mix in small area before using on a commercial scale. 100 gals of spray mix will treat 20,000 sq ft of area when using a typical high volume sprayer. If using a low volume sprayer, adjust concentration to apply the same amount of product per unit area.

One (1) level teaspoon contains 2.4 grams and 1 cup (8 fl oz) contains 4.0 oz by weight of *Safari* 20 SG Insecticide.

Make first application just before pest populations reach an economic threshold. If necessary, make a second application after 14-21 days.

Restrictions:

Not for use on house plants grown inside private residences.

Do not apply more than 2.7 lbs (0.54 lbs ai) per acre of nursery or landscape per year.

To delay the development of resistance: Do not apply *Safari* 20 SG Insecticide or other Group 4A insecticides to consecutive generations of the same insect species without switching to a different mode of action. Do not make more than two sprays of *Safari* 20 SG Insecticide or other Group 4A insecticides to a single crop. Refer to "Resistance Management" section of label for further guidelines.

Appendix 3A

ORNAMENTAL PLANTS AND FORESTS – APPLICATION TO SOIL: For systemic insect control on containerized and field grown (in-ground) ornamental plants in nurseries, greenhouses, interior plantscapes, lath and shadehouses, outdoor landscapes (commercial, industrial, recreational and residential), tree plantations, reforestation nurseries and forests when applied via soil drench, soil injection, micro-irrigation (spaghetti tube or emitter), drip irrigation, overhead irrigation, ebb and flood irrigation equipment or motorized irrigation equipment.

<table>
<tr><th>Crops</th><th>Pests</th><th>Product Rate (By Weight)</th><th>Remarks</th></tr>
<tr>
<td rowspan="2">Ornamental plants including:
Shrubs
Bedding Plants
Flowering Plants
Foliage Plants
Ground Covers
Evergreens
Ornamental Trees
Non-Bearing Fruit Trees
Non-Bearing Nut Trees
Non-Bearing Vines
Christmas Trees
Trees in Plantations including:
Conifers
Deciduous Trees
Reforestation Nurseries
Forests and Wooded Areas: National, Private and State</td>
<td rowspan="2">Adelgids including:
Hemlock Woolly
Balsam Woolly
Aphids including:
Balsam
Crepe Myrtle
Green Peach
Melon
Bagworms
Eastern Tent Caterpillar
Erythinia Gall Wasp
Flatheaded Borers including:
Alder
Bronze Birch
Emerald Ash
Flatheaded Appletree
Two-Lined Chestnut
Froghoppers
Fungus Gnats (larvae)
Gypsy Moth (larvae)
Horned Oak Gall
(continued)</td>
<td>Containerized Plants
Soil Media Drench
3/4 to 1-1/2 pounds per 100 gallons
12 to 24 ounces per 100 gallons
1.5-3.0 teaspoons per gallon

Media Drench Volume for Individual Pots
<table>
<tr><th>Pot diameter (inches)</th><th>Fl oz of dilute solution per pot</th></tr>
<tr><td>4</td><td>2</td></tr>
<tr><td>5</td><td>3</td></tr>
<tr><td>6</td><td>4</td></tr>
<tr><td>7</td><td>5</td></tr>
<tr><td>8</td><td>6</td></tr>
</table>
For larger pot volumes, apply 3-4 fl oz of dilute solution (0.11 to 0.22 g product per 4 fl oz water) per gallon of potting media. Use a drench volume that is sufficient to wet soil media without resulting in overflow or runoff through drain holes in pot.

Containerized Plants
Media Drench Volume for Plants in Raised Beds, Benches, Bedding Flats, Plug and Liner Trays: Apply sufficient dilute solution to wet soil media without loss of liquid from bottom of bed or liner.</td>
<td>Only apply to moist soil media. Do not apply to dry or saturated media.

Do not apply media drench until roots from transplanted plugs or liners have extended at least half way to the edge of pots.

Do not leach treated soil media for at least 7 days after application or performance may be reduced.

Heavy rainfall or excessive irrigation following application may decrease performance.

Higher rates will be needed to control insects on woody plants than on herbaceous plants.

Poinsettia: For optimal control of whiteflies, treat plants 1-3 weeks after pinch. Late season drenches will take longer to provide effective control.</td>
</tr>
</table>

(continued)

Appendix 3A

ORNAMENTAL PLANTS AND FORESTS – APPLICATION TO SOIL (continued)

<table>
<tr><th>Crops</th><th>Pests</th><th colspan="2">Product Rate (By Weight)</th><th>Remarks</th></tr>
<tr><td rowspan="3">Ornamental plants including:
Shrubs
Bedding Plants
Flowering Plants
Foliage Plants
Ground Covers
Evergreens
Ornamental Trees
Non-Bearing Fruit Trees
Non-Bearing Nut Trees
Non-Bearing Vines
Christmas Trees
Trees in Plantations including:
Conifers
Deciduous Trees
Reforestation Nurseries
Forests and Wooded Areas: National, Private and State</td><td rowspan="3">(continued)
Japanese Beetle (adults)
Lacebugs including:
Azalea
Cotoneaster
Hawthorne
Rhododendron
Leaf Beetles including:
Elm
Viburnum
Leafhoppers including:
Glassy-Winged Sharpshooter
Potato
Leafminers including:
Birch
Boxwood
Chrysanthemum
Holly
Serpentine
(continued)</td><td colspan="2">Containerized Plants
Ebb and Flood Irrigation</td><td rowspan="2">Bring several pots to field capacity, let soil dry and then measure amount of water required to bring pots back to field capacity. Multiply the average volume of water required to rehydrate one pot by the number of pots to be treated. Add this volume of water to the minimum amount of water needed to flood the area to be treated. Re-use any returned volume in subsequent irrigation of same plants.
For pot diameter greater than 8", use 3.7-7.5 ounces of Safari 20 SG Insecticide per 1,000 gallons of potting soil media.</td></tr>
<tr><td>Pot diameter (inches)</td><td>Ounces per 1,000 pots</td></tr>
<tr><td>4
5
6
7
8</td><td>1.9-3.7
2.8-5.6
3.7-7.5
4.7-9.3
5.6-11.2</td></tr>
<tr><td rowspan="3"></td><td rowspan="3"></td><td colspan="2">Chemigation of individual containers using a micro-irrigation system (spaghetti tube)</td><td rowspan="2">Use typical injection ratio for injectors (e.g. 1:100, which equals 1 part injector tank solution: 100 parts irrigation water). Do not mix more than 24 oz of Safari 20 SG Insecticide per gallon of injector tank water, or some product may settle out of solution. Calibrate irrigation system to deliver 3-4 fl oz of dilute solution per gallon of potting media.</td></tr>
<tr><td>Injection ratio</td><td>Ounces per gallon of injector tank water</td></tr>
<tr><td>1:100</td><td>12-24</td></tr>
</table>

(continued)

Appendix 3A

ORNAMENTAL PLANTS AND FORESTS – APPLICATION TO SOIL (continued)

Crops	Pests	Product Rate (By Weight)	Remarks
Ornamental plants including: Shrubs Bedding Plants Flowering Plants Foliage Plants Ground Covers Evergreens Ornamental Trees Non-Bearing Fruit Trees Non-Bearing Nut Trees Non-Bearing Vines Christmas Trees Trees in Plantations including: Conifers Deciduous Trees Reforestation Nurseries Forests and Wooded Areas: National, Private and State	(continued) Mealybugs: Citrus Longtailed Madeira Obscure Phormium Pink Hibiscus Root Mimosa Webworm (larvae) Peachtree Borer Pine Tip Moth (larvae) Plantbugs Psyllids including: Asian Citrus Boxwood Root Weevils (larvae and adults) including: Black Vine Diaprepes (continued)	**Field Grown (In-Ground) Shrubs** 3-6 grams (1.25-2.5 level teaspoons) per foot of height 1.0-2.1 ounces per 10 feet of height	When applied to the soil, *Safari* 20 SG Insecticide is taken up by actively growing trees and shrubs. Speed of control will be dependent on plant size, plant health, environmental conditions and how actively pests are feeding. In actively growing plants, control may be evident within 1-3 weeks after application depending on plant size. Time applications to coincide with when most vulnerable pest life stage is present on plants. Control may be less effective when applied to dry, saturated, or frozen soil, or at times when plants are not actively taking up water from soil. If possible, irrigate dry soils 1-3 days before application, or apply irrigation within 3 days after application. Heavy rainfall or inadequate irrigation immediately following application may decrease performance. Use higher labeled rates for broadleaf evergreens with dense foliage (ex. hollies), and with very large trees. **Soil Drench:** Mix required dose in water and uniformly apply to soil around base of shrub or tree. Pull back mulch before drenching. Apply 1-4 pints of drench solution per foot of height (shrubs) or inch of trunk diameter (trees). Adjust drench volume based on soil type, soil moisture and thickness of mulch so that product is moved into root zone. To enhance soil penetration in heavy soils and sloping terrain, dig shallow holes around tree or shrub, and apply drench solution in holes. Lower drench volumes may be less effective in dry soils or when applied over heavy mulch unless there is adequate rainfall or irrigation after application to move product into root zone.

(continued)

Appendix 3A

ORNAMENTAL PLANTS AND FORESTS – APPLICATION TO SOIL (continued)

Crops	Pests	Product Rate (By Weight)	Remarks
Ornamental plants including: Shrubs Bedding Plants Flowering Plants Foliage Plants Ground Covers Evergreens Ornamental Trees Non-Bearing Fruit Trees Non-Bearing Nut Trees Non-Bearing Vines Christmas Trees Trees in Plantations including: Conifers Deciduous Trees Reforestation Nurseries Forests and Wooded Areas: National, Private and State	(continued) Roundheaded Borers (excluding Asian Longhorned) Eucalyptus Longhorned Linden Locust Royal Palm Bug Sawfly larvae Scales (Armored and Soft) including: Azalea Bark Brown Soft Calico California Red Cottony Cushion Cottony Maple Cryptomeria Cycad Aulacaspis Duplachionaspis Elongate Hemlock Euonymus False Florida Red False Oleander (continued)	**Field Grown (In-Ground) Trees (Less than 24" diameter at breast height)** 3-12 grams (1.25-5.0 level teaspoons) per inch of trunk diameter at breast height (DBH) 1.05-4.2 ounces per 10 inches of trunk diameter at breast height (DBH) For multi-stem trees, base rate on cumulative inches of diameter of all stems at breast height.	Soil Injection: Mix required dose in water and make at least four injections per shrub or tree with a low-pressure applicator. Use same amount of solution per hole. Injections can be made using the following methods: Grid System – Space injections on a 2.5 ft center extending to drip line. Circle System – Make injections in concentric circles extending inward from drip line. Basal System – Space injections evenly around trunk no more than 24" out from the base. *Safari* 20 SG Insecticide may be soil injected with low volume (e.g. Kioritz injector) or high volume injection equipment. Inject 1-32 fl oz of dilute solution per foot of height or inch of trunk diameter depending on application equipment. Make shallow injections where feeder roots are most concentrated.
		Field Grown (In-Ground) Trees (24" diameter or greater at breast height) 6-12 grams (2.5-5.0 level teaspoons) per inch of trunk diameter at breast height (DBH) 2.1-4.2 ounces per 10 inches of trunk diameter at breast height (DBH) For multi-stem trees, base rate on cumulative inches of diameter of all stems at breast height.	
		Hedges 0.25-1.0 oz per foot of hedge height per 100 linear feet of hedge row	Apply in enough water to wet the lower 12" of trunk and surrounding soil surface. Apply in a one foot wide band over base of trunk and soil down center of hedgerow. To improve performance, rake back mulch before application.

(continued)

Appendix 3A

ORNAMENTAL PLANTS AND FORESTS – APPLICATION TO SOIL (continued)

<table>
<tr><th>Crops</th><th>Pests</th><th>Product Rate (By Weight)</th><th>Remarks</th></tr>
<tr><td rowspan="8">Ornamental plants including:
Shrubs
Bedding Plants
Flowering Plants
Foliage Plants
Ground Covers
Evergreens
Ornamental Trees
Non-Bearing Fruit Trees
Non-Bearing Nut Trees
Non-Bearing Vines
Christmas Trees
Trees in Plantations including:
Conifers
Deciduous Trees
Reforestation Nurseries
Forests and Wooded Areas: National, Private and State</td><td rowspan="8">Scales (Armored and Soft) (continued)
Fig (Ficus) Wax
Fletcher
Florida Red
Florida Wax
Indian Wax
Lecanium
Lobate Lac
Melanaspis deklei
Obscure
Oystershell
Poplar (Aspen)
Pine Needle
Tea
Tuliptree
Spittlebugs
Tent Caterpillar (larvae)
Thrips including:
Chilli (suppression)
Citrus
Cuban Laurel
Gladiolus
Gynaikothrips uzeli (suppression)
Western Flower (suppression)
Treehoppers
Walnut Twig Beetle
Whiteflies including:
Ficus
Giant
Greenhouse
Silverleaf / Sweetpotato (B and Q Biotypes)
White Grubs including:
Oriental Beetle
White Pine Weevil</td><td colspan="2">Field Grown Nursery Stock
Banded spray application to soil surface
(2.7 lbs per acre)</td><td rowspan="2">Apply as a uniform band in row over root zone and lower 6-12" of trunk. Apply from peak adult flight to peak egg hatch.
Apply in at least two gallons of water per 1,000 linear feet. Irrigate after application to move product into soil profile.
Control any weeds in treated area prior to application, or performance may be reduced.
Adjust rates accordingly for other row spacing. Irrigate after application to move Safari 20 SG Insecticide to the root zone.</td></tr>
<tr><td>Row spacing in feet</td><td>Ounces per 1,000 linear feet of row</td></tr>
<tr><td>3</td><td>3</td></tr>
<tr><td>4</td><td>4</td></tr>
<tr><td>5</td><td>5</td></tr>
<tr><td>6</td><td>6</td></tr>
<tr><td>7</td><td>7</td></tr>
<tr><td>8</td><td>8</td></tr>
<tr><td colspan="2">Broadcast spray to soil of plant beds
(2.7 lbs per acre)</td><td>Apply over the top of ornamental plant beds in a water volume sufficient to move product to soil surface. If necessary, irrigate after application to move product off of foliage and into upper root zone of soil. May be less effective on large woody shrubs than on herbaceous annuals and perennials.</td></tr>
</table>

Important Notes:
One (1) level teaspoon contains 2.4 grams, and 1 cup (8 fl oz) contains 4.0 oz by weight of *Safari* 20 SG Insecticide.

For all soil applications, including chemigation, retreatments may be made after 7 days but do not apply more than 2.7 lbs (0.54 lbs ai) per acre of nursery, landscape or forest per year.

Restrictions:
Do not apply more than 2.7 lbs (0.54 lbs ai) per acre of nursery, landscape or forest per year.

To delay the development of resistance in greenhouses, nurseries and interiorscapes, do not make more than one soil application per crop cycle or three months, whichever is shorter. Refer to "Resistance Management" section of the label for additional guidelines.

Appendix 3A

ORNAMENTAL PLANTS AND FORESTS

BASAL TRUNK SPRAYS IN TREES AND LARGE SHRUBS
For systemic insect control in containerized and field grown (in-ground) ornamental trees and shrubs in nurseries, interior plantscapes, lath and shadehouses, outdoor landscapes (commercial, industrial, recreational and residential), tree plantations and forests when applied as a trunk spray.

Crops	Pests	Product Rate (By Weight)	Remarks
Shrubs Ornamental Trees Non-Bearing Fruit Trees Non-Bearing Nut Trees Trees in Plantations including: Conifer Deciduous Reforestation Nurseries Forests and Wooded Areas: National, Private and State	Adelgids including: Hemlock Woolly Aphids Flatheaded Borers including: Alder Bronze Birch Emerald Ash Flatheaded Appletree Two-lined Chestnut Lacebugs Leaf Beetles Leafhoppers Leafminers Mealybugs Mountain Pine Beetle Pine Tip Moth (larvae) Psyllids Roundheaded Borers (excluding Asian Longhorned) Scales including: Calico Cryptomeria Elongate Hemlock Fig (Ficus) Wax Thrips (suppression) Walnut Twig Beetle Whiteflies including: Fig (Ficus)	12-24 oz per gallon Depending on bark type and thickness, one gallon of spray solution will typically cover 65-85" of cumulative trunk diameter (1.5-2.0 fl oz per inch of trunk diameter) when applied to trunk between soil surface and 4-5 feet above soil surface.	When sprayed on the trunk, *Safari* 20 SG Insecticide will be absorbed through the bark and into the vascular system, and then transported throughout the tree. Speed of control will be dependent on tree size, tree health, environmental conditions and how actively pests are feeding. In actively transpiring trees, control may be evident within 1-3 weeks after application. Spray bark on root flare (buttress roots) and on trunk between soil surface and 4-5 feet above the soil surface. Adjust nozzle to uniformly distribute spray over the entire circumference of the tree trunk and buttress roots. Wet bark just to the point of saturation and run off onto soil. Apply ONLY with a low volume sprayer operated at less than 20 PSI to prevent tree damage, bounce back and drift of spray droplets. Time applications to coincide with when most vulnerable pest life stage is present on plants. **Do not apply to wet bark, during rainfall or if rain is expected within 12 hours.** Control may be less effective in trees with thick bark, and at times when trees are not actively growing or transpiring. For Mountain Pine Beetle: apply from 2 weeks before to 2 weeks after expected peak of adult flight activity.
Christmas Trees Ornamental Trees with trunk diameter less than 3" at soil line	Elongate Hemlock Scale Cryptomeria Scale Ficus (Fig) Whitefly	1.5-6.0 oz/gallon One gallon of spray solution will typically cover 325-425" of cumulative trunk diameter (0.3-0.4 fl oz per inch of trunk diameter) when applied to trunk between soil surface and 1 foot above soil surface	For Christmas trees and ornamental trees less than 3" in diameter at soil line, spray trunk just to point of runoff between soil surface and 12" above soil surface.

One (1) level teaspoon contains 2.4 grams, and 1 cup (8 fl oz) contains 4.0 oz by weight of *Safari* 20 SG Insecticide.

Restrictions:
Do not apply more than 2.7 lbs (0.54 lbs ai) per acre of nursery, forest or landscape per year.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage, disposal or cleaning of equipment.

Pesticide Storage: Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Store in a cool dry place. Do not store diluted spray. For help with any spill, leak, fire or exposure involving this material, call day or night 1-800-892-0099.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Handling: Nonrefillable container: Do not reuse or refill this container. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

CONDITIONS OF SALE

Valent U.S.A. Corporation warrants that this product in its unopened package conforms to the chemical description on the label and is reasonably fit for the purposes set forth on the label when used according to directions under normal use conditions to the crops specified. To the extent consistent with applicable law, there are no other warranties, expressed or implied, concerning the use of this product other than indicated on the label. To the extent consistent with applicable law, this warranty does not extend to the handling or use of this product contrary to label instructions or under abnormal conditions or conditions not reasonably foreseeable to seller, and buyer assumes all risk of any such use.

Manufactured for
Valent U.S.A. Corporation
P.O. Box 8025
Walnut Creek CA 94596-8025
Made in U.S.A.
Form 1510-G
LMS 16APR14
EPA Reg. No. 86203-11-59639
EPA Est. 67545-AZ-01

Information contained in this booklet is accurate at the time of printing. Since product testing is a continuous process, please read and follow the directions on the product label for the most current directions and precautionary statements.

Always check with your state to verify state registration status or call 800-89-VALENT (898-2536).

For state registration and/or supplemental labels, please call or visit us online.

Products That Work, From People Who Care® | **valentpro.com** | 800-89-VALENT (898-2536)

Always read and follow label instructions.

Safety Data Sheet

Safari™ 20 SG Insecticide

1. IDENTIFICATION: CHEMICAL PRODUCT AND COMPANY

PRODUCT NAME: Safari™ 20 SG Insecticide
VC NUMBER(S): 1455
SYNONYM(S): Dinotefuran 20% SG
EPA REGISTRATION NUMBER: 86203-11-59639; 33657-16-59639

PRODUCT DESCRIPTION: Insecticide for greenhouse, nursery, interior plantscape and outdoor landscape use.

Safari is a registered trademark of Valent U.S.A. Corporation.

MANUFACTURER/DISTRIBUTOR
VALENT U.S.A. CORPORATION
P.O. Box 8025
1600 Riviera Avenue, Suite 200
Walnut Creek, CA 94596-8025

EMERGENCY TELEPHONE NUMBERS
HEALTH EMERGENCY OR SPILL (24 hr):
(800) 892-0099
TRANSPORTATION (24 hr.): CHEMTREC
(800) 424-9300 or (202) 483-7616

PRODUCT INFORMATION
PROFESSIONAL PRODUCTS: (800) 898-2536

The current SDS is available through our website (www.valent.com), or by calling the product information numbers listed above.

2. HAZARDS IDENTIFICATION

For EPA FIFRA-specific information see Section 15

Classification

Acute toxicity - Oral	Category 4

Label elements

EMERGENCY OVERVIEW

WARNING

Hazard statements
Harmful if swallowed

Precautionary Statements - Prevention
Read product label prior to using this product. For specific handling instruction refer to Section 7, Handling and Storage

Precautionary Statements - Response
See Section 4, First Aid Measures

Precautionary Statements - Storage
For information on Storage and Handling see Section 7.

Precautionary Statements - Disposal
For further information on product and container disposal see Section 13.

Hazards not otherwise classified (HNOC)
Other Information
<5% of the mixture consists of ingredient(s) of unknown toxicity

For information on Transportation requirements see Section 14.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Weight/ Percent	TRADE SECRET
Dinotefuran Technical (99% ai)	165252-70-0	20.2	
Sodium dodecylbenzene sulfonate	25155-30-0	1 - 5	
Others	(Various CAS#s)	72	

* The chemical name, CAS number and/or exact percentage have been withheld as a trade secret

Other ingredients, which may be maintained as trade secrets, are any substances other than an active ingredient contained in this product. Some of these may be hazardous, but their identities are withheld because they are considered trade secrets. The hazards associated with the other ingredients are addressed in this document. Specific information on other ingredients for the management of exposures, spills, or safety assessments can be obtained by a treating physician or nurse by calling **(800) 892-0099** at any time.

4. FIRST AID MEASURES

EMERGENCY NUMBER (800) 892-0099

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact **1-800-892-0099** for emergency medical treatment information.

EYE CONTACT:
Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

SKIN CONTACT:
Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

INGESTION:
Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. DO NOT induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

INHALATION:
Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

NOTES TO PHYSICIAN:
None

5. FIRE FIGHTING MEASURES

Flash point °C Not Applicable
EXTINGUISHING MEDIA: Water fog, carbon dioxide, foam, dry chemical

FLAMMABLE LIMITS IN AIR - LOWER (%): Not applicable
FLAMMABLE LIMITS IN AIR - UPPER (%): Not applicable

NFPA RATING:

Health:	1
Flammability:	3
Reactivity:	1
Special:	None

(Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using professional judgement. Values were not available in the guidelines or published evaluations prepared by the National Fire Protection Association, NFPA.

FIRE FIGHTING INSTRUCTIONS: Products of combustion from fires involving this material may be toxic. Avoid breathing smoke and mists. Avoid personnel and equipment contact with fallout and runoff. Minimize the amount of water used for fire fighting. Do not enter any enclosed area without full protective equipment, including self-contained breathing equipment. Contain and isolate runoff and debris for proper disposal. Decontaminate personal protective equipment and fire fighting equipment before reuse.

This material is not expected to burn or explode in normal conditions, but will burn violently if involved in a fire. Dinotefuran becomes self-reactive in high temperatures. Exposure to heat may promote violent decomposition.

HAZARDOUS DECOMPOSITION PRODUCTS: Normal combustion forms carbon dioxide, water vapor and may produce: Oxides of nitrogen.

6. ACCIDENTAL RELEASE MEASURES

VALENT EMERGENCY PHONE NUMBER: (800) 892-0099
CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300
OBSERVE PRECAUTIONS IN SECTION 8: PERSONAL PROTECTION
Stop the source of the spill if safe to do so. Contain the spill to prevent further contamination of the soil, surface water, or ground water. For additional spill response information refer to the North American Emergency Response Guidebook.

UN/NA NUMBER: Not applicable **EMERGENCY RESPONSE GUIDEBOOK NO.:** Not applicable

FOR SPILLS ON LAND:

CONTAINMENT: Remove all sources of ignition. Ventilate area of leak or spill. Clean-up personnel may require protection from inhalation of dust. Avoid runoff into storm sewers or other bodies of water.

CLEANUP: Clean up spill immediately in a manner that does not disperse dust into the air and place in a chemical waste container. Wash area with soap and water. Pick up wash liquid with additional absorbent and place in a chemical waste container.

FOR SPILLS IN WATER:

CONTAINMENT: This material will disperse or dissolve in water. Stop the source of the release. Contain and isolate to prevent further release into soil, surface water and ground water.

CLEANUP: Clean up spill immediately. Absorb spill with inert material. Remove contaminated water for treatment or disposal.

7. HANDLING AND STORAGE

END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

HANDLING:

Keep away from all possible sources of ignition (sparks or flame). Avoid high temperatures exceeding 150°C. Keep container closed. Use only with adequate ventilation.

To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring the material. Use explosion-proof electrical equipment. Take precautionary measures against static discharges.

STORAGE:

Keep pesticide in original container. Do not store or transport near food or feed. Do not contaminate food or feed. Do not put concentrate into food or drink containers. Do not dilute concentrate in food or drink containers. Store in a cool, dry place, out of direct sunlight. Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Do not store diluted spray.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

INFORMATION FOR END USERS
Mixers, loaders, applicators and other handlers should refer to the product label before use for detailed information on personal protective equipment (PPE).

EYES & FACE: Do not get this material in your eyes. Eye contact can be avoided by wearing protective eyewear.

RESPIRATORY PROTECTION: Use this material only in well ventilated areas. If operating conditions result in airborne concentrations of this material, the use of an approved respirator is recommended.

SKIN & HAND PROTECTION: Applicators and other handlers must wear: long-sleeved shirt and long pants, shoes plus socks and chemical-resistant gloves made of any waterproof material.

Follow manufacturer's instructions for cleaning/maintaining PPE. If there are no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENGINEERING CONTROLS: Use in a well ventilated area.

EXPOSURE LIMITS

Chemical Name	ACGIH Exposure Limits	OSHA Exposure Limits	Manufacturer's Exposure Limits
Dinotefuran Technical (99% ai)	None	None	None
Sodium dodecylbenzene sulfonate	None	None	None
Others	Unknown	Unknown	Unknown

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	Solid		
Appearance	Granules	**Odor**	Odorless
Color	Off-white	**Odor threshold**	No information available

PROPERTIES	Values	Remarks • Method
pH	7.6	(1% solution)
Melting point/freezing point	107.5 °C	Melting point (Dinotefuran Technical)
Boiling point/boiling range	Decomposed at 208°C (Technical)	
Flash point	Not Applicable	
Evaporation rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limits in Air		
Upper flammability limits	No information available	
Lower flammability limit	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Specific Gravity	No information available	
Water solubility	Soluble in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	
Density	No information available	
Bulk density	0.56 g/mL	

10. STABILITY AND REACTIVITY

Reactivity
Not an oxidizing or reducing agent.

Chemical stability
Stable under normal ambient conditions.

Possibility of Hazardous Reactions
This material is combustible and may form explosive dust-air mixture.

Conditions to avoid
Extremes of temperature and direct sunlight.

Incompatible materials
Heat and ignition sources. Oxidizers.

Hazardous Decomposition Products
Normal combustion forms carbon dioxide, water vapor and may produce: oxides of nitrogen.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Oral Toxicity LD_{50} (rats)	> 2,000 mg/kg	EPA Tox Category	III
Dermal Toxicity LD_{50} (rabbits)	> 2,000 mg/kg	EPA Tox Category	III
Inhalation Toxicity LC_{50} (rats)	> 2.94 mg/L (4 hr)	EPA Tox Category	IV
Eye Irritation (rabbits)	Brief and/or minor irritation	EPA Tox Category	IV
Skin Irritation (rabbits)	Brief and/or minor irritation	EPA Tox Category	IV
Skin Sensitization (guinea pigs)	Non-sensitizer	EPA Tox Category	Not applicable

CARCINOGEN CLASSIFICATION

Chemical Name	IARC	OSHA - Select Carcinogens	NTP Carcinogen List
Dinotefuran Technical (99% ai)	Not listed	Not listed	Not listed
Sodium dodecylbenzene sulfonate	Not listed	Not listed	Not listed
Others	Unknown	Unknown	Unknown

TOXICITY OF DINOTEFURAN TECHNICAL

SUBCHRONIC: Dinotefuran technical was tested in 13-week dietary toxicity studies in rats, mice and dogs. In the rat study, a NOEL of 500 ppm was established, based on reduced body weight gain in females and adrenal cortical vacuolation in males and a NOAEL of 5,000 ppm based on marked growth retardation at 25,000 ppm (adrenal cortical vacuolation not adverse). A NOEL of 25,000 ppm was established in the mouse study based on reduced body weight gain at 50,000 ppm. In the dog 13-week dietary study, a NOEL of 8,000 ppm was established based on reduced body weight gain. No target organs were identified in subchronic inhalation or dermal toxicity studies in rats.

CHRONIC/CARCINOGENICITY: Dinotefuran technical was tested in lifetime studies with rats and mice and a one-year study with dogs. In common with the subchronic studies in these species, no specific target organs could be identified. In the 78-week mouse study a NOAEL of 2500 ppm was established, based on decreased weight gain and a decrease in circulating platelet counts. In the 104-week rat study a NOAEL of 2000 ppm was established, based on a decrease in weight gain in females. There were no treatment-related effects in rats or mice on survival or the nature and incidence of neoplastic and adverse non-neoplastic histomorphological findings in either species at any dose level. In the 52-week dog study a NOAEL of 16000 ppm was established based on decreased weight gain in both sexes and decreased food consumption in females.

NEUROTOXICITY: Dinotefuran did not produce any functional or histomorphological evidence of neurotoxicity in acute (gavage) and 13-week (dietary) neurotoxicity studies in rats. The NOEL for neurotoxicity in the acute study was 1,500 mg/kg, the highest dose level administered. The NOEL for neurotoxicity in the 13-week dietary study was 50,000 ppm. The NOEL for all effects in this study was 5,000 ppm based on reduced body weight gain and food consumption.

DEVELOPMENTAL TOXICITY: In a developmental toxicity study of Dinotefuran technical in rats the maternal NOAEL was 300 mg/kg/day based on reduced weight gain, food consumption and water intake at 1000 mg/kg/day. Dinotefuran technical did not produce developmental effects in rats at doses up to 1000 mg/kg/day (the highest does tested). In a study with rabbits the maternal NOAEL was 52 mg/kg/day based on reduced weight gain, food consumption and water intake and clinical signs noted at 300 mg/kg/day and pathology findings in the liver and stomach at 125 mg/kg/day and higher. The developmental NOEL was 300 mg/kg/day.

REPRODUCTION: Dinotefuran technical was tested in a two-generation rat reproduction study at doses of 0, 300, 1000, 3000 and 10000 ppm. The NOAEL for systemic toxicity in parental animals was 3000 ppm based on decreased body weight gain and food consumption and decreased spleen and thyroid weights at the highest dose level evaluated (10000 ppm). The NOAEL for reproductive effects was 10000 ppm. The NOAEL for effects on the offspring was 3000 ppm based on reduced preweaning weight gain at 10000 ppm.

MUTAGENICITY: Dinotefuran technical was negative in the following in vitro assays: Ames Assay, mouse lymphoma (L5178Y), mammalian cytogenetics (CHL/IU) or DNA Repair. Dinotefuran technical was negative in the following in vivo assays: mouse micronucleus. Overall, Dinotefuran technical does not present a genetic hazard.

For a summary of the potential for adverse health effects from exposure to this product, refer to Section 2. For information regarding regulations pertaining to this product, refer to Section 15.

12. ECOLOGICAL INFORMATION

AVIAN TOXICITY:

Dinotefuran Technical is practically non-toxic to moderately toxic to avian species. Test results include:
Oral LD_{50} quail: greater than 2000 mg/kg
Dietary LC_{50} Mallard duck: greater than 997.9 ppm
Dietary LC_{50} quail: greater than 1301 ppm
Reproduction quail: NOEL = 5000 ppm
Reproduction Mallard duck: NOEL = 2000 ppm

AQUATIC ORGANISM TOXICITY:

Dinotefuran Technical is practically non-toxic to fish and ranges from practically nontoxic to highly toxic to aquatic invertebrate species (especially shrimp.) Test results include:
LC_{50} (96 hr) Bluegill Sunfish: greater than 100 mg/L
LC_{50} (96 hr) Rainbow Trout: greater than 100 mg/L
LC_{50} (96 hr) Common Carp: greater than 100 mg/L
LC_{50} (96 hr) Sheepshead Minnow: greater than 109 mg/L
NOEC (early life stage) Rainbow Trout: greater than 10 mg/L
EC_{50} (48 hr) Daphnia magna: greater than 1000 mg/L
NOEC (lifecycle) Daphnia magna: > 10 mg/L
LC_{50} (96 hr) saltwater Mysid Shrimp: 0.79 mg/L
NOEC (lifecycle) saltwater Mysid Shrimp: 0.089mg/L
EC_{50} (96 hr) Oyster Shell Deposition: greater than 141 mg/L
ErC_{50} (0-72 hr) Algae (P. subcapitata): greater than 100 mg/L

OTHER NON-TARGET ORGANISM TOXICITY:

Dinotefuran Technical is highly toxic to bees. The acute oral and contact LD_{50} in bees were 0.056 µg/bee and 0.022 ug/bee, respectively. This product is highly toxic to bees or other pollinating insects exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees or other pollinating insects are foraging in the treatment area.

OTHER ENVIRONMENTAL INFORMATION:

This pesticide is toxic to shrimp. Do not apply directly to water, to areas where surface water is present or to intertidal areas below mean high water mark. Do not apply where runoff is likely to occur. Do not apply where weather conditions favor drift from areas treated. Do not contaminate water when cleaning equipment or disposing of equipment washwater or rinsate.

13. DISPOSAL CONSIDERATIONS

END USERS MUST DISPOSE OF ANY UNUSED PRODUCT AS PER THE LABEL RECOMMENDATIONS.

PRODUCT DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Non-refillable container. Do not reuse or refill this container. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill or by incineration.

DISPOSAL METHODS: Check government regulations and local authorities for approved disposal of this material. Dispose of in accordance with applicable laws and regulations.

14. TRANSPORTATION INFORMATION

DOT (ground) SHIPPING NAME:	Not regulated for domestic ground transport by U.S. DOT
REMARKS:	None
EMERGENCY RESPONSE GUIDEBOOK NO.:	Not applicable
ICAO/IATA SHIPPING NAME:	UN 3077 Environmentally Hazardous Substance, Solid, N.O.S. (Dinotefuran), 9, III, Marine Pollutant
REMARKS:	Single or inner packaging less than 5 L (liquid) or 5 Kg net (solids) excepted from Dangerous Goods regulations -- see IATA Special Provision A197. For U.S. Shipping, Emergency Response Guidebook No. 171
IMDG SHIPPING NAME:	UN 3077 Environmentally Hazardous Substance, Solid, N.O.S. (Dinotefuran), 9, III, Marine Pollutant
REMARKS:	Single or inner packaging less than 5 L (liquid) or 5 Kg net (solids) excepted from Dangerous Goods regulations – see IMDG 2.10.2.7US shipping, Emergency Response Guidebook No. 171
EMS NO.:	F-A, S-F

15. REGULATORY INFORMATION

EPA-FIFRA LABEL INFORMATION THAT DIFFERS FROM OSHA-GHS REQUIREMENTS:

This material is a pesticide product registered by the EPA under FIFRA and is subject to certain labeling requirements under federal pesticide law. These requirements may differ from the classification criteria and hazard information required by OSHA GHS for safety data sheets, and for workplace labels of non-pesticide chemicals. The following is the hazard information as required on the FIFRA pesticide label:

EPA FIFRA SIGNAL WORD: CAUTION

- ***Harmful if swallowed***
- ***Harmful if absorbed through skin***
- ***Causes moderate eye irritation***
- ***Avoid contact with eyes, skin and clothing***
- ***Wash thoroughly with soap and water after handling.***
- ***Remove contaminated clothing and wash before re-use.***
- ***Keep out of reach of children.***
-

PESTICIDE REGULATIONS: All pesticides are governed under FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act). Therefore, the regulations presented below are pertinent only when handled outside of the normal use and applications of pesticides. This includes waste streams resulting from manufacturing/formulation facilities, spills or misuse of products, and storage of large quantities of products containing hazardous or extremely hazardous substances.

U.S. FEDERAL REGULATIONS: Ingredients in this product are reviewed against an inclusive list of federal regulations. Therefore, the user should consult appropriate authorities. The federal regulations reviewed include: Clean Water Act, SARA, CERCLA, RCRA, DOT, TSCA and OSHA. If no components or information is listed in the space below this paragraph, then none of the regulations reviewed are applicable.

Sodium dodecylbenzene sulfonate

TSCA Inventory List -	Present
Clean Water Act - Hazardous Substances	Present
CERCLA Reportable Quantity (RQ):	1000 lb 454 kg

SARA (311, 312):

Immediate Health:	Yes
Chronic Health:	No
Fire:	Yes
Sudden Pressure:	No
Reactivity:	No

STATE REGULATIONS: Each state may promulgate standards more stringent than the federal government. This section cannot encompass an inclusive list of all state regulations. Therefore, the user should consult state or local authorities. The state regulations reviewed include: California Proposition 65, California Directors List of Hazardous Substances, Massachusetts Right to Know, Michigan Critical Materials List, New Jersey Right to Know, Pennsylvania Right to Know, Rhode Island Right to Know and the Minnesota Hazardous Substance list. For Washington State Right to Know, see Section 8 for Exposure Limit information. For Louisiana Right to Know refer to SARA information listed under U.S. Regulations above. If no components or information is listed in the space below this paragraph, then none of the regulations reviewed are applicable.

Sodium dodecylbenzene sulfonate

California - Directors List of Hazardous Substances	Present
MA Right To Know	Present
NJ Right To Know	1698
PA Right To Know	Environmental hazard

For information regarding potential adverse health effects from exposure to this product, refer to Sections 2 and 11.

16. OTHER INFORMATION

REASON FOR ISSUE:	Updated information to meet OSHA Hazcom 2012 (GHS) regulations.
SDS NO.:	0426
EPA REGISTRATION NUMBER:	86203-11-59639; 33657-16-59639
REVISION NUMBER:	1
REVISION DATE:	05/23/2015
SUPERCEDES DATE:	None
RESPONSIBLE PERSON(S):	Valent U.S.A. Corporation, Corporate EH&S, (925) 256-2803

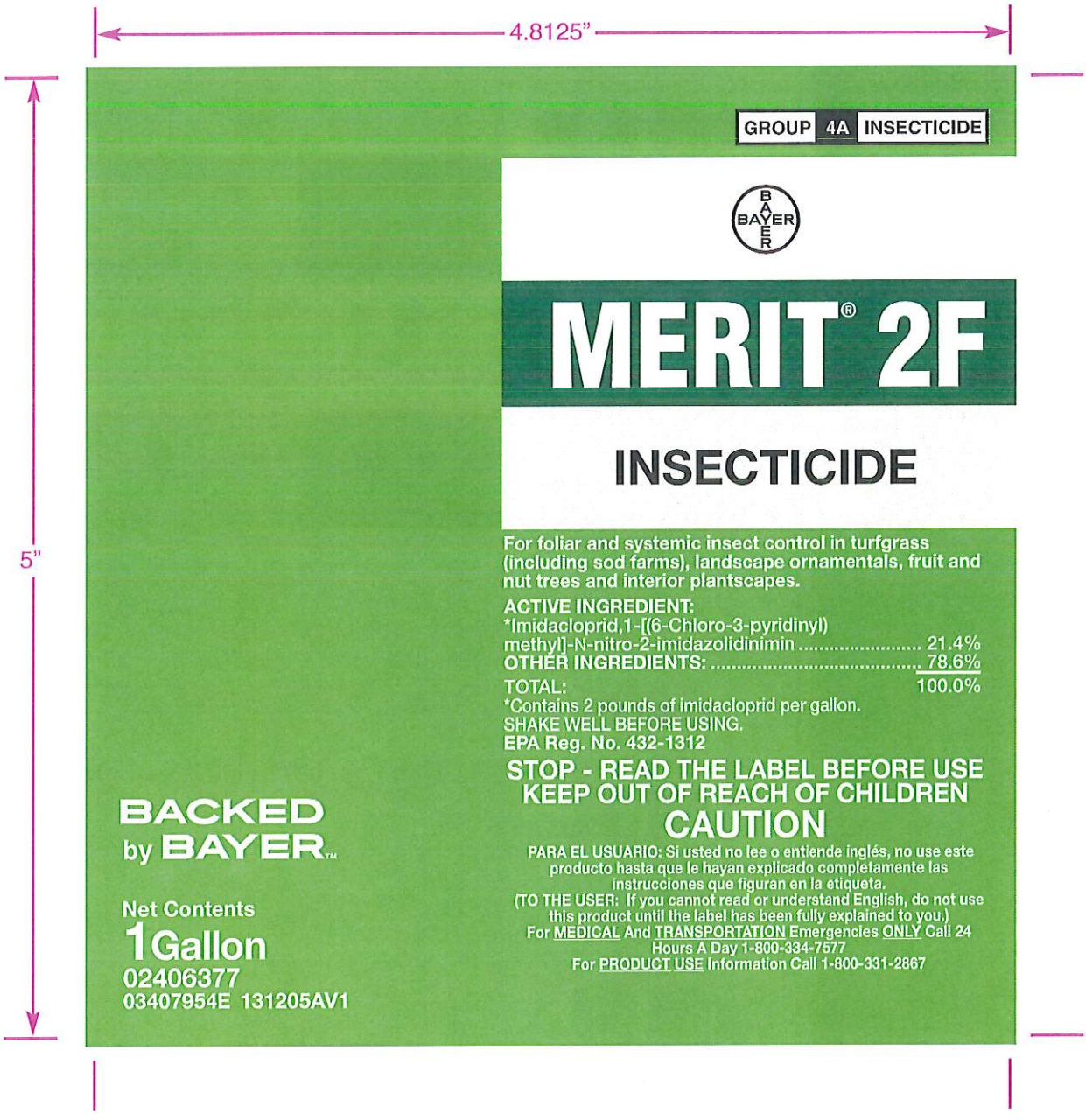
This Safety Data Sheet (SDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-APPROVED PRODUCT LABELING (attached to and accompanying the product container). This SDS provides important health, safety, and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course.

Use, storage and disposal of pesticide products is regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling. All necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of federal law to use a pesticide product in any manner not prescribed on the EPA-approved label.

The information in this SDS is based on data available to us as of the revision date given herein, and believed to be correct. Contact Valent U.S.A. Corporation to confirm if you have the most current SDS.

Judgments as to the suitability of information herein for the individual's own use or purposes are necessarily the individual's own responsibility. Although reasonable care has been taken in the preparation of such information, Valent extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the individual's purposes or the consequences of its use.

Appendix 3A



Appendix 3A

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FIRST AID	
If swallowed:	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.
If in eyes	• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
In case of emergency call toll free the Bayer Environmental Science Emergency Response Telephone No. 800-334-7577. Have a product container or label with you when calling a poison control center or doctor, or going for treatment.	
Note To Physician: No specific antidote is available. Treat the patient symptomatically.	

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION

Harmful if swallowed or absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Keep children or pets off treated area until spray is dry.

Personal Protective Equipment (PPE):

WPS USES: Applicators and Other Handlers who handle this product for any use covered by the Worker Protection Standard (40 CFR part 170) – in general, agricultural plant uses e.g., use in sod farms, must wear:

- Long-sleeved shirt and long pants
- Chemical resistant gloves made of any waterproof material such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinylchloride (PVC) or viton. If you want more options, follow the instructions for category A on an EPA chemical-resistance category selection chart.
- Shoes plus socks

Follow manufacturer's instructions for cleaning/ maintaining personal protective equipment, PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Non-WPS USES: Applicators and other handlers who handle this product for any use NOT covered by the Worker Protection Standard (40 CFR part 170) – in general, only agricultural plant uses are covered by the WPS, must wear:

- Shirt and pants
- Gloves
- Shoes plus socks

Engineering controls statements:

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

User should:

- Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco.
- Remove and wash contaminated clothing before reuse.

ENVIRONMENTAL HAZARDS

This product is highly toxic to aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

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This product is highly toxic to bees exposed to direct treatment or residues on blooming crops/plants or weeds. Do not apply this product or allow it to drift to blooming crops/plants or weeds if bees are foraging the treatment area.
This chemical demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

PROTECTION OF POLLINATORS

APPLICATION RESTRICTIONS EXIST FOR THIS PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT POLLINATORS.

Look for the bee hazard icon  in the Directions for Use for each application site for specific use restrictions and instructions to protect bees and other insect pollinators.

This product can kill bees and other insect pollinators.
Bees and other insect pollinators will forage on plants when they flower, shed pollen, or produce nectar.
Bees and other insect pollinators can be exposed to this pesticide from:

- Direct contact during foliar applications, or contact with residues on plant surfaces after foliar applications
- Ingestion of residues in nectar and pollen when the pesticide is applied as a seed treatment, soil, tree injection, as well as foliar applications.

When Using This Product Take Steps To:

- Minimize exposure of this product to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of this product on to beehives or to off-site pollinator attractive habitat. Drift of this product onto beehives or off-site to pollinator attractive habitat can result in bee kills.

Information on protecting bees and other insect pollinators may be found at the Pesticide Environmental Stewardship website at: http://pesticidestewardship.org/PollinatorProtection/Pages/default.aspx.
Pesticide incidents (for example, bee kills) should immediately be reported to the state/tribal lead agency. For contact information for your state, go to: www.aapco.org/officials.html. Pesticide incidents should also be reported to the National Pesticide Information Center at: www.npic.orst.edu or directly to EPA at: beekill@epa.gov

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

SEE INDIVIDUAL SITES FOR SPECIFIC POLLINATOR PROTECTION APPLICATION RESTRICTIONS. IF NONE EXIST UNDER THE SPECIFIC SITE, FOR OUTDOOR FOLIAR APPLICATIONS, FOLLOW THESE APPLICATION DIRECTIONS.

NON-AGRICULTURAL USES

Do not apply Merit® 2F Insecticide while bees are foraging. Do not apply Merit 2F Insecticide to plants that are flowering. Only apply after all flower petals have fallen off.

MERIT 2F Insecticide can be used as directed on sod farms, and on turfgrass, and ornamentals on such sites: residential home lawns, business and office complexes, shopping complexes, multi-family residential complexes, golf courses, airports, cemeteries, parks, playgrounds, and athletic fields.
MERIT 2F Insecticide can be used by soil application as directed on trees, shrubs, flowers, and groundcovers in sites: in and around the perimeter of industrial and commercial buildings and residential areas, and municipal, city, state, national, and private wooded and forested areas.

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RESTRICTION: Not for use in commercial greenhouses, nurseries, or on grasses grown for seed, or on commercial fruit and nut trees.
RESISTANCE: Some insects are known to develop resistance to insecticides after repeated use. As with any insecticide, the use of this product should conform to resistance management strategies established for the use area.
MERIT 2F Insecticide contains a Group 4A insecticide. Insect biotypes with acquired or inherent resistance to Group 4A insecticides may eventually dominate the insect population if Group 4A insecticides are used repeatedly as the predominant method of control for targeted species.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.
Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 12 hours.
Exception: If the product is applied by drenching, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.
PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls
- Chemical resistant gloves made of any waterproof material such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinylchloride (PVC) or viton. If you want more options, follow the instructions for category A on an EPA chemical-resistance category selection chart.
- Shoes plus socks

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses and sod farm production.
Keep children and pets off treated area until dry.

APPLICATION TO TURFGRASS

MERIT 2F Insecticide can be used for the control of soil inhabiting pests of turfgrass, such as Northern & Southern masked chafers, *Cyclocephala borealis*, *C. immaculata*, and/or *C. lurida*; Asiatic garden beetle, *Maladera castanea*; European chafer, *Rhizotroqus majalis*; Green June beetle, *Cotinis nitida*; May or June beetle, *Phyllophaga* spp.; Japanese beetle, *Popillia japonica*; Oriental beetle, *Anomala orientalis*; Billbugs, *Sphenophorus* spp.; Annual bluegrass weevil, *Hyperodes* spp.; Black turfgrass ataenius, *Ataenius spretulus* and *Aphodius* spp. European Crane Fly *Tipula paludosa*, and mole crickets,. *scapteriscus* spp. MERIT 2F Insecticide can also be used for suppression of cutworms and chinch bugs.
The active ingredient in MERIT 2F Insecticide has sufficient residual activity so that applications can be made preceding the egg laying activity of the target pests. High levels of control can be achieved when applications are made preceding or during the egg laying period. The need for an application can be based on historical monitoring of the site, previous records or experiences, current season adult trapping or other methods. Optimum control will be achieved when applications are made prior to egg hatch of the target pests, followed by sufficient irrigation or rainfall to move the active ingredient through the thatch.
Do not apply when turfgrass areas are waterlogged or the soil is saturated with water. Adequate distribution of the active ingredient cannot be achieved when these conditions exist. The treated turf area must be in such a condition that the rainfall or irrigation will penetrate vertically in the soil profile.
RESTRICTION: Do not apply more than a total of 1.6 pints (0.4 lb of active ingredient) per acre per year.

APPLICATION EQUIPMENT FOR USE ON TURFGRASS

Apply MERIT 2F Insecticide in sufficient water to provide adequate distribution in the treated area. The use of accurately calibrated equipment normally used for the application of turfgrass insecticides is required. Use equipment which will produce a uniform, coarse droplet spray, using a low pressure setting to eliminate off target drift. Check calibration periodically to ensure that equipment is working properly.

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APPLICATION TO ORNAMENTALS

MERIT 2F Insecticide is for use on ornamentals in commercial and residential landscapes and interior plantscapes. MERIT 2F Insecticide is a systemic product and will be translocated upward into the plant system from root uptake. To assure optimum effectiveness, the product must be placed where the growing portion of the target plant can absorb the active ingredient. The addition of a nitrogen containing fertilizer, where applicable, into the solution may enhance the uptake of the active ingredient. Application can be made by foliar application or soil applications; including soil injection, drenches, and broadcast sprays. Foliar applications offer locally systemic activity against insect pests.

When making soil applications to plants with woody stems, systemic activity will be delayed until the active ingredient is translocated throughout the plant. In some cases, this translocation delay could take 60 days or longer. For this reason, make application prior to anticipated pest infestation to achieve optimum levels of control.

RESTRICTION: Outdoor applications cannot exceed a total of 1.6 pints (0.4 lb of active ingredient) per acre per year.

ANT MANAGEMENT PROGRAMS

Use MERIT 2F to control aphids, scale insects, mealybugs and other sucking pests on ornamentals to limit the honeydew available as a food source for ant populations. MERIT 2F Insecticide applications can be then be supplemented with residual sprays, bait placements or other ant control tactics to further reduce the pest population.

APPLICATION EQUIPMENT FOR FOLIAR APPLICATIONS

MERIT 2F Insecticide mixes readily with water and may be used in many types of application equipment. Mix product with the required amount of water and apply as desired dependent upon the selected use pattern.

When making foliar applications on hard to wet foliage such as holly, pine, or ivy, the addition of a spreader/ sticker is recommended. If concentrate or mist type spray equipment is used, apply an equivalent amount on the area sprayed, as would be used in a dilute application.

MERIT 2F Insecticide has been found to be compatible with commonly used fungicides, miticides, liquid fertilizers, and other commonly used insecticides. Check physical compatibility using the correct proportion of products in a small jar test if local experience is unavailable.

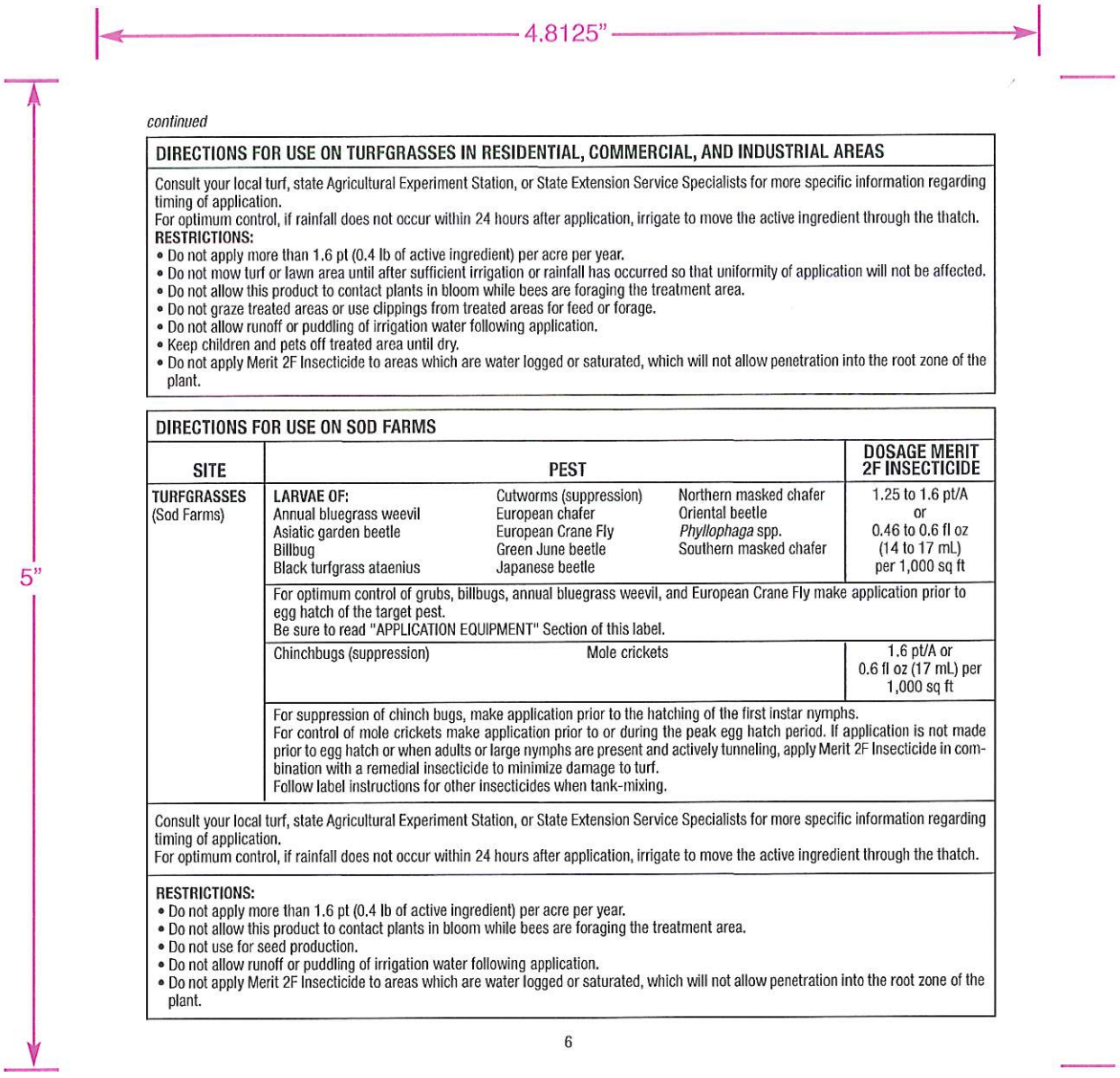
RESTRICTION: Do not apply through any irrigation system.

DIRECTIONS FOR USE ON TURFGRASSES IN RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL AREAS

SITE	PEST			DOSAGE MERIT 2F INSECTICIDE
TURFGRASSES (Residential home lawns, business and office complexes, shopping complexes, multi-family residential complexes, golf courses, airports, cemeteries, parks, playgrounds, athletic fields)	**LARVAE OF:** Annual bluegrass weevil Asiatic garden beetle Billbug Black turfgrass ataenius	Cutworms (suppression) European chafer European Crane Fly Green June beetle Japanese beetle	Northern masked chafer Oriental beetle *Phyllophaga* spp. Southern masked chafer	1.25 to 1.6 pt/A or 0.46 to 0.6 fl oz (14 to 17 mL) per 1000 sq ft
	For optimum control of grubs, billbugs, annual bluegrass weevil, and European Crane Fly make application prior to egg hatch of the target pest. Be sure to read "APPLICATION EQUIPMENT" Section of this label.			
	Chinchbugs (suppression)	Mole crickets		1.6 pt/A or 0.6 fl oz (17 mL) per 1000 sq ft
	For suppression of chinch bugs, make application prior to the hatching of the first instar nymphs. For control of mole crickets make application prior to or during the peak egg hatch period. If application is not made prior to egg hatch or when adults or large nymphs are present and actively tunneling, apply Merit 2F Insecticide in combination with a remedial insecticide to minimize damage to turf. Follow label instructions for other insecticides when tank-mixing.			

continued

Appendix 3A



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DIRECTIONS FOR USE ON TURFGRASSES IN RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL AREAS

Consult your local turf, state Agricultural Experiment Station, or State Extension Service Specialists for more specific information regarding timing of application.
For optimum control, if rainfall does not occur within 24 hours after application, irrigate to move the active ingredient through the thatch.

RESTRICTIONS:

- Do not apply more than 1.6 pt (0.4 lb of active ingredient) per acre per year.
- Do not mow turf or lawn area until after sufficient irrigation or rainfall has occurred so that uniformity of application will not be affected.
- Do not allow this product to contact plants in bloom while bees are foraging the treatment area.
- Do not graze treated areas or use clippings from treated areas for feed or forage.
- Do not allow runoff or puddling of irrigation water following application.
- Keep children and pets off treated area until dry.
- Do not apply Merit 2F Insecticide to areas which are water logged or saturated, which will not allow penetration into the root zone of the plant.

DIRECTIONS FOR USE ON SOD FARMS

SITE	PEST			DOSAGE MERIT 2F INSECTICIDE
TURFGRASSES (Sod Farms)	**LARVAE OF:** Annual bluegrass weevil Asiatic garden beetle Billbug Black turfgrass ataenius	Cutworms (suppression) European chafer European Crane Fly Green June beetle Japanese beetle	Northern masked chafer Oriental beetle *Phyllophaga* spp. Southern masked chafer	1.25 to 1.6 pt/A or 0.46 to 0.6 fl oz (14 to 17 mL) per 1,000 sq ft
	For optimum control of grubs, billbugs, annual bluegrass weevil, and European Crane Fly make application prior to egg hatch of the target pest. Be sure to read "APPLICATION EQUIPMENT" Section of this label.			
	Chinchbugs (suppression)	Mole crickets		1.6 pt/A or 0.6 fl oz (17 mL) per 1,000 sq ft
	For suppression of chinch bugs, make application prior to the hatching of the first instar nymphs. For control of mole crickets make application prior to or during the peak egg hatch period. If application is not made prior to egg hatch or when adults or large nymphs are present and actively tunneling, apply Merit 2F Insecticide in combination with a remedial insecticide to minimize damage to turf. Follow label instructions for other insecticides when tank-mixing.			

Consult your local turf, state Agricultural Experiment Station, or State Extension Service Specialists for more specific information regarding timing of application.
For optimum control, if rainfall does not occur within 24 hours after application, irrigate to move the active ingredient through the thatch.

RESTRICTIONS:

- Do not apply more than 1.6 pt (0.4 lb of active ingredient) per acre per year.
- Do not allow this product to contact plants in bloom while bees are foraging the treatment area.
- Do not use for seed production.
- Do not allow runoff or puddling of irrigation water following application.
- Do not apply Merit 2F Insecticide to areas which are water logged or saturated, which will not allow penetration into the root zone of the plant.

Appendix 3A

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DIRECTIONS FOR APPLICATION TO OUTDOOR ORNAMENTALS IN RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL LANDSCAPE AREAS

SITE	PEST	DOSAGE MERIT 2F INSECTICIDE
Trees Shrubs Evergreens Flowers Foliage plants Groundcovers	Adelgids (including hemlock woolly adelgid) Aphids Leaf-feeding beetles (Japanese beetle, emerald ash borer and vine weevil adults) Leaf-feeding bugs (including lace bugs, leaf bugs, and plant bugs) Leafhoppers, planthoppers, sharpshooters (including glassy-winged sharpshooter) and spittle bugs) Mealybugs Psyllids Sawfly larvae Thrips (foliage only) Whiteflies	1.5 fl oz (45mL) per 100 gal of water
	Foliar Applications: Start treatments prior to establishment of high pest populations and reapply on an as needed basis.	
	White grub larvae (such as Japanese beetle larvae, Chafers, *Phyllophaga* spp., Asiatic garden beetle, Oriental beetle)	0.46 to 0.6 fl oz (14 to 17mL) per 1,000 sq ft
	Broadcast Applications: Mix required amount of product in sufficient water to uniformly and accurately cover the area being treated. Do not use less than 2 gallons of water per 1000 sq ft. For optimum control, irrigate thoroughly to incorporate MERIT 2F Insecticide into the upper soil profile.	

RESTRICTIONS:
- **Follow application restrictions for Non-Agricultural Uses on page 3 to protect bees and other insect pollinators**
- Do not apply more than 1.6 pt (0.4 lb of active ingredient) per acre per year.
- Keep children and pets off treated area until dry.
- Do not apply this product, by any application method, to linden, basswood, or other Tilia species.

DIRECTIONS FOR APPLICATION TO PLANTS GROWN INDOORS

SITE	PEST	DOSAGE MERIT 2F INSECTICIDE
Interior plantscapes	Adelgids (including hemlock woolly adelgid) Aphids Leaf-feeding beetles (Japanese beetle, emerald ash borer and vine weevil adults) Leaf-feeding bugs (including lace bugs, leaf bugs, and plant bugs) Leafhoppers, planthoppers, sharpshooters (including glassy-winged sharpshooter) and spittle bugs) Mealybugs Psyllids Sawfly larvae Thrips (foliage only) Whiteflies	1.5 fl oz (45mL) per 100 gal of water
	Foliar Applications: Start treatments prior to establishment of high pest populations and reapply on an as needed basis.	
	White grub larvae (such as Japanese beetle larvae, Chafers, *Phyllophaga* spp., Asiatic garden beetle, Oriental beetle)	0.46 to 0.6 fl oz (14 to 17mL) per 1,000 sq ft
	Broadcast Applications: Mix required amount of product in sufficient water to uniformly and accurately cover the area being treated. Do not use less than 2 gallons of water per 1,000 sq ft. For optimum control, irrigate thoroughly to incorporate Merit 2F Insecticide into the upper soil profile.	

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Appendix 3A

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DIRECTIONS FOR APPLICATION TO PLANTS GROWN INDOORS
RESTRICTIONS: • Not for use in commercial greenhouses.

DIRECTIONS FOR APPLICATION TO TREES AND SHRUBS BY SOIL DRENCH AND SOIL INJECTION		
For use in and around the perimeter of industrial and commercial buildings, in residential and recreational areas, and in municipal, city, state, national, and private wooded and forested areas.		
Trees and Shrubs	0.1 to 0.2 fl oz (3 to 6 mL) per inch of trunk diameter (D.B.H.) or per foot of shrub height	
Adelgids (including hemlock woolly adelgid) Aphids Leaf-feeding beetles (including Japanese beetle and vine weevil adults) Leaf-feeding bugs (including lace bugs, leaf bugs, and plant bugs)	Leafhoppers, planthoppers, sharpshooters (including glassy-winged sharpshooter) and spittle bugs Leafminers Mealybugs Pine tip moth larvae Psyllids	Royal palm bug Sawfly larvae Soft scales Whiteflies
Trees and Shrubs	0.2 fl oz (6 mL) per inch of trunk diameter (D.B.H.) or per foot of shrub height	
Armored scales (including but not limited to: camellia, false oleander, Florida red, oystershell, tea, and white peach scales)	Flatheaded borers (including emerald ash borer) Roundheaded borers (including Asian longhorned beetle) Thrips (foliage only)	White grub, billbug, and root weevil larvae
Trees with a 15 inch of trunk diameter at breast height (D.B.H.) or greater	Apply the following rates as a function of tree diameter at breast height (DBH) 0.1 to 0.4 fl. oz (3 to 12 mL) per inch of trunk diameter (DBH). You may use the higher rate (0.3 -0.4 fl oz) to control the pests listed below. RESTRICTION: Do not apply more than 1.6 pints (0.4 lb of active ingredient) per acre per year. DBH = is measured at 4.5 feet from the ground	
Emerald Ash Borer	Bronze birch borer	Asian Longhorned Beetle	Eucalyptus Longhorned Borer	Alder Borer
Soil Injection: GRID SYSTEM: Space holes on 2.5 foot centers, in a grid pattern, extending to the drip line of the tree. CIRCLE SYSTEM: Apply in holes evenly spaced in circles, (use more than one circle dependent upon the size of the tree) beneath the drip line of the tree extending in from that line. BASAL SYSTEM: Space injection holes evenly around the base of the tree trunk no more than 6 to 12 inches out from the base. Mix required dosage in sufficient water to inject an equal amount of solution in each hole. Maintain a low pressure and use sufficient solution for distribution of the liquid into the treatment zone. For optimum control, keep the treated area moist for 7 to 10 days. Do not use less than 4 holes per tree or shrub. **Soil Drench:** Uniformly apply the dosage in no less than 10 gallons of water per 1000 square feet as a drench around the base of the tree, directed to the root zone. Remove plastic or any other barrier that will stop solution from reaching the root zone. **For Control of Specified Borers:** Application to trees already heavily infested may not prevent the eventual loss of the trees due to existing pest damage and tree stress. **RESTRICTION:** **No Soil Injection Applications Allowed in Nassau or Suffolk Counties of New York.**				

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DIRECTIONS FOR APPLICATION TO TREES AND SHRUBS BY SOIL DRENCH AND SOIL INJECTION	
GROUND TREATMENT PRE-PLANTING	0.46 to 0.6 fl oz (14 to 17 mL) per 1000 sq ft
Apply as a broadcast treatment and incorporate into the soil before planting.	

RESTRICTION:
- Do not apply more than 1.6 pints (0.4 lb of active ingredient) per acre per year.
- Keep children and pets off treated area until dry.
- Do not apply Merit 2F Insecticide to areas which are water logged or saturated, which will not allow penetration into the root zone of the plant.
- Do not apply this product, by any application method, to linden, basswood, or other Tilia species.

DIRECTIONS FOR FOLIAR APPLICATION TO POME FRUITS, PECANS, AND GRAPES GROWN IN RESIDENTIAL AREAS

SITE	PEST		RATE PER APPLICATION	
Pome Fruits Apple Crabapple Loquat Mayhaw Pear Pear (oriental) Quince	Aphids (except Wooly apple aphid) Leafhoppers (including glassy-winged sharpshooter)	Leafminer Mealybugs* San Jose scale*	1.5 fl oz (45 mL) per 100 gal	6.0 fl oz/A[1]

Apply specified dosage as foliar spray as needed after petal-fall is complete.
For control of rosy apple aphid, apply prior to leafrolling caused by the pest.
For first generation leafminer control, make first application as soon as petal-fall is complete. Greatest leafminer control will result from the earliest possible application. For second and succeeding generations of leafminer, optimal control is obtained from applications made early in the adult flight against egg and early instar larvae. A second application may be required 10 days later if severe pressure continues or if generations are overlapping. A single application may result in suppression only. MERIT 2F Insecticide will not control late stage larvae.
For San Jose Scale, time applications to the crawler stage. Treat each generation.
For late season (preharvest) control of leafhopper species, apply MERIT 2F Insecticide while most leafhoppers are in the nymphal stage.
For optimal control of mealybug, insure good spray coverage of the trunk and scaffolding limbs or other resting sites of the mealybug.

RESTRICTIONS
- **Follow application restrictions for Non-Agricultural Uses on page 3 to protect bees and other insect pollinators.**
- Do not apply more than 6.0 fl oz per acre in a single application.
- Do not make more than 4 applications.
- Allow 10 or more days between applications.
- Do not apply more than 1.6 pints (0.4 lb of active ingredient) per acre per year.
- Allow at least 7 days between last application and harvest.
- * Not for use in California for control on pears.
- Keep children and pets off treated area until dry.

Pecans*	Yellow pecan aphid Black margined aphid Pecan leaf phylloxera	Pecan spittlebug Pecan stem phylloxera	1.5 fl oz (45 mL) per 100 gal	6.0 fl oz/A[1]

Make foliar applications as pests begin to build before populations become extreme. Two applications at a 10 to 14 day interval may be required to achieve control. Scout and retreat if needed.
Thorough uniform coverage of foliage is necessary for optimal control. Addition of an organosilicone-based spray adjuvant at a rate not to exceed the adjuvant manufacturer's recommended use rate may improve coverage.

continued

Appendix 3A

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DIRECTIONS FOR FOLIAR APPLICATION TO POME FRUITS, PECANS, AND GRAPES GROWN IN RESIDENTIAL AREAS			
SITE	**PEST**	**RATE PER APPLICATION**	
RESTRICTIONS • **Follow application restrictions for Non-Agricultural Uses on page 3 to protect bees and other insect pollinators.** • Do not apply more than a total of 18.0 fl oz of Merit 2F Insecticide per acre per year. • Do not make more than 3 applications. • Allow 10 or more days between applications. • Allow at least 7 days between last application and harvest. • Keep children and pets off treated area until dry.			
[1] The amount of MERIT 2F required per acre will depend on tree size and volume of foliage present. The rate per acre is based on a standard of 400 gallons of dilute spray solution per acre for large trees. * Use on pecans not permitted in California unless directed by specific supplemental labeling.			
Grapes	Leafhoppers (including glassy-winged sharpshooter) Mealybugs	1.5 fl oz (45 mL) per 100 gal	3.0 fl oz/A 90 mL/A
Apply specified dosage as a foliar spray using 200 gallons of water per acre.			
RESTRICTIONS • **Follow application restrictions for Non-Agricultural Uses on page 3 to protect bees and other insect pollinators.** • Do not apply more than a total of 6.0 fl oz of Merit 2F Insecticide per acre per year. • Allow at least 14 days between applications. • Applications may be applied up to and including day of harvest. • Keep children and pets off treated area until dry.			

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

Pesticide Storage: Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container and out of the reach of children, preferably in a locked storage area.

Handle and open container in a manner as to prevent spillage. If the container is leaking, invert to prevent leakage. If container is leaking or material spilled for any reason or cause, carefully dam up spilled material to prevent runoff. Refer to Precautionary Statements on label for hazards associated with the handling of this material. Do not walk through spilled material. Absorb spilled material with absorbing type compounds and dispose of as directed for pesticides above. In spill or leak incidents, keep unauthorized people away. You may contact the Bayer Environmental Science Emergency Response Team for decontamination procedures or any other assistance that may be necessary. The Bayer Environmental Science Emergency Response Telephone No. is 1-800-334-7577 or contact Chemtrec at 1-800-424-9300.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Handling: Non-refillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying.

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Offer for recycling, if available, or reconditioning, or puncture and dispose of in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

Appendix 3A

4.8125"

5"

IMPORTANT: READ BEFORE USE

Read the entire Directions for Use, Conditions, Disclaimer of Warranties and Limitations of liability before using this product.
If terms are not acceptable, return the unopened product container at once. By using this product, user or buyer accepts the following Conditions, Disclaimer of Warranties and Limitations of Liability.

CONDITIONS: The directions for use of this product are believed to be adequate and must be followed carefully. However, it is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Bayer CropScience LP. All such risks shall be assumed by the user or buyer.

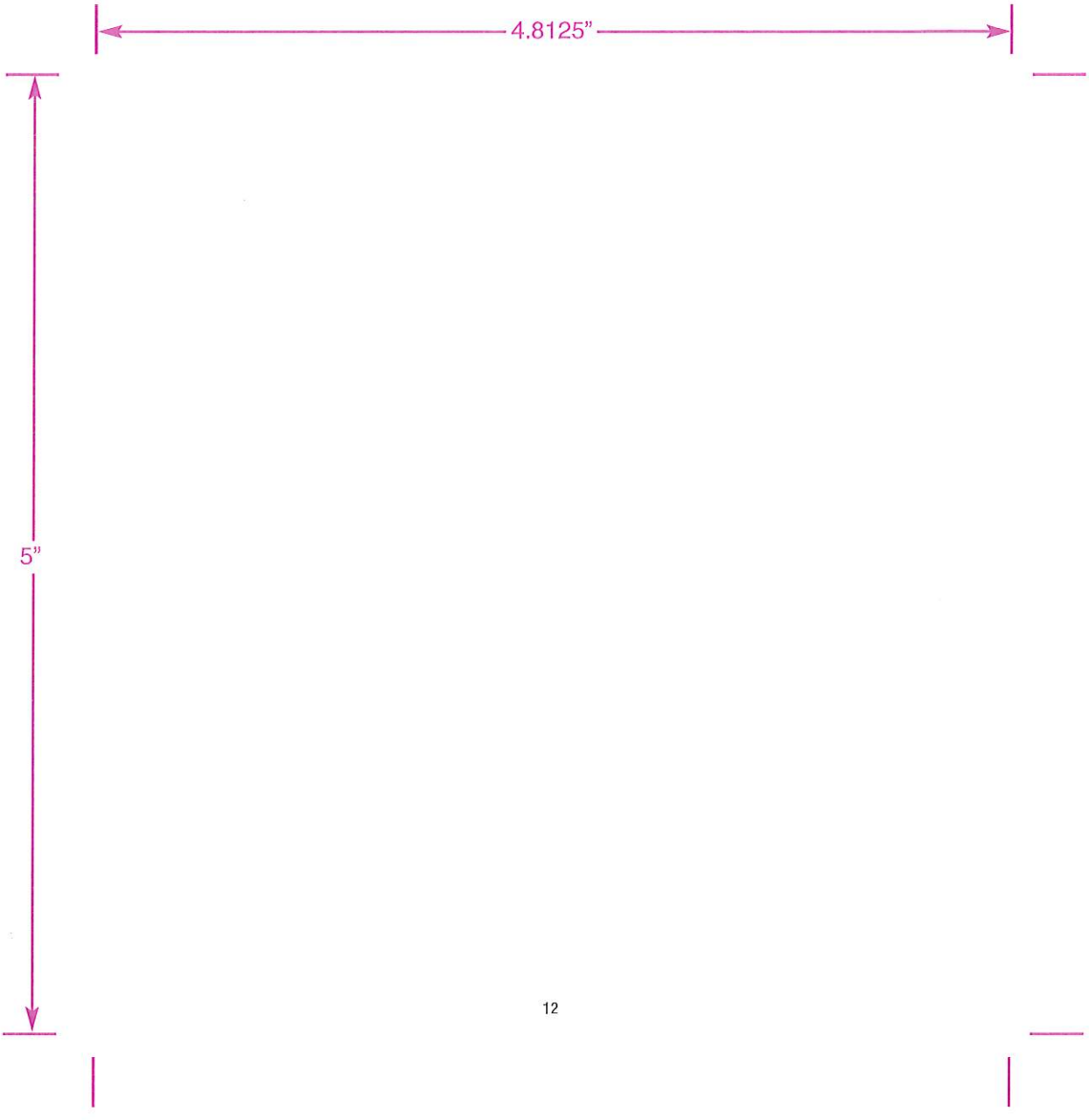
DISCLAIMER OF WARRANTIES: TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BAYER CROPSCIENCE LP MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, THAT EXTEND BEYOND THE STATEMENTS MADE ON THIS LABEL. No agent of Bayer CropScience is authorized to make any warranties beyond those contained herein or to modify the warranties contained herein. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BAYER CROPSCIENCE LP DISCLAIMS ANY liability whatsoever for special, incidental or consequential damages, resulting from the use or handling of this product.

LIMITATIONS OF LIABILITY: TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, WHETHER IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE, SHALL NOT EXCEED THE PURCHASE PRICE PAID, OR AT BAYER CROPSCIENCE LP'S ELECTION, THE REPLACEMENT OF PRODUCT.

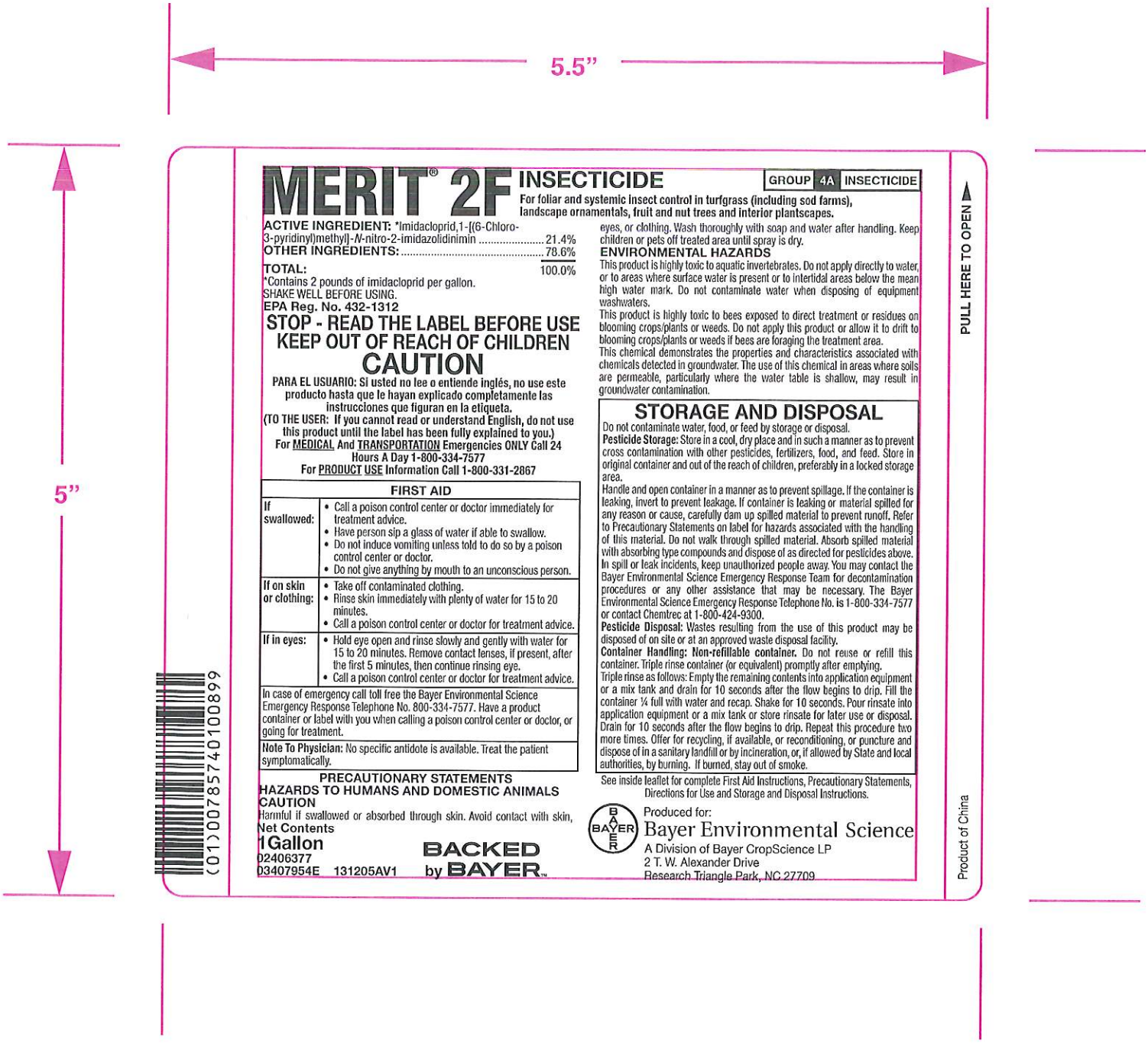
Produced for:
Bayer Environmental Science
A Division of Bayer CropScience LP
2 T. W. Alexander Drive
Research Triangle Park, NC 27709

Appendix 3A

Merit 2F 1 gal 3407954E 131205AV1 ETL 022714 with crops.ai Merit 2F 1 gal 3407954E 131205AV1 ETL 022714 with crops 2/27/14 1



Appendix 3A



MERIT® 2F INSECTICIDE

GROUP 4A INSECTICIDE

For foliar and systemic insect control in turfgrass (including sod farms), landscape ornamentals, fruit and nut trees and interior plantscapes.

ACTIVE INGREDIENT: *Imidacloprid,1-[(6-Chloro-3-pyridinyl)methyl]-*N*-nitro-2-imidazolidinimin 21.4%
OTHER INGREDIENTS: 78.6%
TOTAL: 100.0%

*Contains 2 pounds of imidacloprid per gallon.
SHAKE WELL BEFORE USING.
EPA Reg. No. 432-1312

STOP - READ THE LABEL BEFORE USE
KEEP OUT OF REACH OF CHILDREN
CAUTION

PARA EL USUARIO: Si usted no lee o entiende inglés, no use este producto hasta que le hayan explicado completamente las instrucciones que figuran en la etiqueta.
(TO THE USER: If you cannot read or understand English, do not use this product until the label has been fully explained to you.)
For MEDICAL And TRANSPORTATION Emergencies ONLY Call 24 Hours A Day 1-800-334-7577
For PRODUCT USE Information Call 1-800-331-2867

FIRST AID	
If swallowed:	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
If on skin or clothing:	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.
If in eyes:	• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
In case of emergency call toll free the Bayer Environmental Science Emergency Response Telephone No. 800-334-7577. Have a product container or label with you when calling a poison control center or doctor, or going for treatment.	
Note To Physician: No specific antidote is available. Treat the patient symptomatically.	

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION
Harmful if swallowed or absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Keep children or pets off treated area until spray is dry.

ENVIRONMENTAL HAZARDS
This product is highly toxic to aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.
This product is highly toxic to bees exposed to direct treatment or residues on blooming crops/plants or weeds. Do not apply this product or allow it to drift to blooming crops/plants or weeds if bees are foraging the treatment area.
This chemical demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

STORAGE AND DISPOSAL
Do not contaminate water, food, or feed by storage or disposal.
Pesticide Storage: Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container and out of the reach of children, preferably in a locked storage area.
Handle and open container in a manner as to prevent spillage. If the container is leaking, invert to prevent leakage. If container is leaking or material spilled for any reason or cause, carefully dam up spilled material to prevent runoff. Refer to Precautionary Statements on label for hazards associated with the handling of this material. Do not walk through spilled material. Absorb spilled material with absorbing type compounds and dispose of as directed for pesticides above. In spill or leak incidents, keep unauthorized people away. You may contact the Bayer Environmental Science Emergency Response Team for decontamination procedures or any other assistance that may be necessary. The Bayer Environmental Science Emergency Response Telephone No. is 1-800-334-7577 or contact Chemtrec at 1-800-424-9300.
Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.
Container Handling: Non-refillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying.
Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Offer for recycling, if available, or reconditioning, or puncture and dispose of in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

See inside leaflet for complete First Aid Instructions, Precautionary Statements, Directions for Use and Storage and Disposal Instructions.

Net Contents
1 Gallon
02406377
03407954E 131205AV1

BACKED by BAYER™

Produced for:
Bayer Environmental Science
A Division of Bayer CropScience LP
2 T. W. Alexander Drive
Research Triangle Park, NC 27709

PULL HERE TO OPEN

Product of China

(01)00785740100899

Bayer Environmental Science
SAFETY DATA SHEET

MERIT® 2F INSECTICIDE

Version 3.0 / USA
102000015064
Revision Date: 03/07/2014
Print Date: 03/26/2015

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product identifier

Trade name	MERIT® 2F INSECTICIDE
Product code (UVP)	06004481
SDS Number	102000015064
EPA Registration No.	432-1312

Relevant identified uses of the substance or mixture and uses advised against

Use	Insecticide
Restrictions on use	See product label for restrictions.

Information on manufacturer

Bayer Environmental Science
2 T.W. Alexander Drive
Research Triangle PK, NC 27709
United States

Emergency Telephone Number (24hr/ 7 days)	1-800-334-7577 (24 hours/day)
Product Information Telephone Number	1-800-331-2867
SDS Information or Request	SDSINFO.BCS-NA@bayer.com

SECTION 2: HAZARDS IDENTIFICATION

Classification in accordance with regulation HCS 29CFR §1910.1200
Eye irritation : Category 2B
Signal word: Warning

Hazard statements
Causes eye irritation.

Precautionary statements
Wash thoroughly after handling.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.

Other hazards
No other hazards known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Component Name	CAS-No.	Average % by Weight
Imidacloprid	138261-41-3	21.40
Glycerine	56-81-5	10.00

SECTION 4: FIRST AID MEASURES

Description of first aid measures

General advice When possible, have the product container or label with you when calling a poison control center or doctor or going for treatment.

Inhalation Move to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a physician or poison control center immediately.

Skin contact Take off contaminated clothing and shoes immediately. Wash off immediately with plenty of water for at least 15 minutes. Call a physician or poison control center immediately.

Eye contact Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a physician or poison control center immediately.

Ingestion Call a physician or poison control center immediately. Rinse out mouth and give water in small sips to drink. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Do not leave victim unattended.

Most important symptoms and effects, both acute and delayed

Symptoms To date no symptoms are known.

Indication of any immediate medical attention and special treatment needed

Treatment Appropriate supportive and symptomatic treatment as indicated by the patient's condition is recommended. There is no specific antidote.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing media

Suitable Water spray, Foam, Carbon dioxide (CO2), Dry chemical

Unsuitable None known.

Advice for firefighters

Special protective equipment for fire-fighters Firefighters should wear NIOSH approved self-contained breathing apparatus and full protective clothing.

Further information	Keep out of smoke. Fight fire from upwind position. Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses.
Flash point	> 93 °C
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Explosivity	not applicable
Dust explosion class	Not applicable.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Precautions	Keep unauthorized people away. Isolate hazard area. Avoid contact with spilled product or contaminated surfaces.

Methods and materials for containment and cleaning up

Methods for cleaning up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Collect and transfer the product into a properly labelled and tightly closed container. Clean contaminated floors and objects thoroughly, observing environmental regulations.
Additional advice	Use personal protective equipment. Do not allow to enter soil, waterways or waste water canal.
Reference to other sections	Information regarding safe handling, see section 7. Information regarding personal protective equipment, see section 8. Information regarding waste disposal, see section 13.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling	Handle and open container in a manner as to prevent spillage. Maintain exposure levels below the exposure limit through the use of general and local exhaust ventilation.
Hygiene measures	Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics. Remove Personal Protective Equipment (PPE) immediately after handling this product. Before removing gloves clean them with soap and water. Remove soiled clothing immediately and clean thoroughly before using again. Wash thoroughly and put on clean clothing.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers Store in a cool, dry place and in such a manner as to prevent cross contamination with other crop protection products, fertilizers, food, and feed. Store in original container and out of the reach of children, preferably in a locked storage area.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Components	CAS-No.	Control parameters	Update	Basis
Imidacloprid	138261-41-3	0.7 mg/m3 (TWA)		OES BCS*
Imidacloprid	138261-41-3	5ug/m3 (AN ESL)	07 2011	TX ESL
Imidacloprid	138261-41-3	50ug/m3 (ST ESL)	07 2011	TX ESL
Glycerine (Total dust.)	56-81-5	15 mg/m3 (PEL)	02 2006	OSHA Z1
Glycerine (Respirable fraction.)	56-81-5	5 mg/m3 (PEL)	02 2006	OSHA Z1
Glycerine (Respirable fraction.)	56-81-5	5 mg/m3 (TWA)	1989	OSHA Z1A
Glycerine (Total dust.)	56-81-5	10 mg/m3 (TWA)	1989	OSHA Z1A
Glycerine (Total dust and mist.)	56-81-5	10 mg/m3 (TWA)	06 2008	TN OEL
Glycerine (Respirable fraction and dust or fume.)	56-81-5	5 mg/m3 (TWA)	06 2008	TN OEL
Glycerine (Particulate.)	56-81-5	50ug/m3 (ST ESL)	02 2013	TX ESL
Glycerine (Particulate.)	56-81-5	5ug/m3 (AN ESL)	02 2013	TX ESL
Glycerine (Vapor.)	56-81-5	100ug/m3 (AN ESL)	02 2013	TX ESL
Glycerine (Vapor.)	56-81-5	1000ug/m3 (ST ESL)	02 2013	TX ESL

*OES BCS: Internal Bayer CropScience "Occupational Exposure Standard"

Exposure controls

Personal protective equipment
In normal use and handling conditions please refer to the label and/or leaflet. In all other cases the following recommendations would apply.

Respiratory protection When respirators are required, select NIOSH approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industry recommendations.

Hand protection	Chemical resistant nitrile rubber gloves
Eye protection	Tightly fitting safety goggles
Skin and body protection	Wear long-sleeved shirt and long pants and shoes plus socks.
General protective measures	Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and warm/tepid water. Keep and wash PPE separately from other laundry.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	white to light beige
Physical State	liquid suspension
Odor	mild
Odour Threshold	no data available
pH	7.5
Vapor Pressure	no data available
Vapor Density (Air = 1)	no data available
Density	1.12 g/cm³ at 20 °C
Evapouration rate	no data available
Boiling Point	no data available
Melting / Freezing Point	-6.7 °C / 19.9 °F
Water solubility	dispersible
Minimum Ignition Energy	not applicable
Decomposition temperature	no data available
Partition coefficient: n-octanol/water	no data available
Viscosity	350 - 600 mPa.s
Flash point	> 93 °C
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Explosivity	not applicable
Dust explosion class	Not applicable.

SECTION 10: STABILITY AND REACTIVITY

Reactivity

Thermal decomposition	no data available
Chemical stability	Stable under recommended storage conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	freezing
Incompatible materials	no data available
Hazardous decomposition products	No decomposition products expected under normal conditions of use.

SECTION 11: TOXICOLOGICAL INFORMATION

Exposure routes	Ingestion, Skin Absorption, Eye contact, Inhalation
Immediate Effects	
Eye	May cause mild irritation to eyes.
Skin	May cause slight irritation. Harmful if absorbed through skin.
Ingestion	Harmful if swallowed.

Information on toxicological effects

Acute oral toxicity	LD50 (male rat) > 4,870 mg/kg LD50 (female rat) 4,143 mg/kg
Acute inhalation toxicity	LC50 (male/female combined rat) > 5.33 mg/l Exposure time: 4 h Determined in the form of liquid aerosol. (actual) LC50 (male/female combined rat) > 20 mg/l Exposure time: 1 h Determined in the form of liquid aerosol. Extrapolated from the 4 hr LC50. (actual)
Acute dermal toxicity	LD50 (male/female combined rabbit) > 2,000 mg/kg
Skin irritation	No skin irritation (rabbit)
Eye irritation	Minimally irritating. (rabbit)
Sensitisation	Non-sensitizing. (guinea pig)

Assessment repeated dose toxicity

Imidacloprid did not cause specific target organ toxicity in experimental animal studies.

Assessment Mutagenicity

Imidacloprid was not mutagenic or genotoxic based on the overall weight of evidence in a battery of in vitro and in vivo tests.

Assessment Carcinogenicity

Imidacloprid was not carcinogenic in lifetime feeding studies in rats and mice.

ACGIH

None.

NTP

None.

IARC

None.

OSHA

None.

Assessment toxicity to reproduction

Imidacloprid caused reproduction toxicity in a two-generation study in rats only at dose levels also toxic to the parent animals. The reproduction toxicity seen with Imidacloprid is related to parental toxicity.

Assessment developmental toxicity

Imidacloprid caused developmental toxicity only at dose levels toxic to the dams. The developmental effects seen with Imidacloprid are related to maternal toxicity.

Further information

Only acute toxicity studies have been performed on the formulated product.
The non-acute information pertains to the active ingredient(s).

SECTION 12: ECOLOGICAL INFORMATION

Toxicity to fish	LC50 (Rainbow trout (Oncorhynchus mykiss)) 211 mg/l Exposure time: 96 h The value mentioned relates to the active ingredient imidacloprid.
Toxicity to aquatic invertebrates	EC50 (Water flea (Daphnia magna)) 85 mg/l Exposure time: 48 h The value mentioned relates to the active ingredient imidacloprid.
	LC50 (Chironomus riparius (non-biting midge)) 0.0552 mg/l Exposure time: 24 h The value mentioned relates to the active ingredient imidacloprid.
Toxicity to aquatic plants	EC50 (Desmodesmus subspicatus) > 10 mg/l Growth rate; Exposure time: 72 h The value mentioned relates to the active ingredient imidacloprid.
Biodegradability	Imidacloprid: ; not rapidly biodegradable

Koc	Imidacloprid: Koc: 225
Bioaccumulation	Imidacloprid: ; Does not bioaccumulate.
Mobility in soil	Imidacloprid: Moderately mobile in soils
Environmental precautions	Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water. Apply this product as specified on the label. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods

Product	Do not contaminate water, food, or feed by disposal. Dispose in accordance with all local, state/provincial and federal regulations.
Contaminated packaging	Do not re-use empty containers. Triple rinse containers. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration, or if allowed by State and Local authorities, by burning. If burned, stay out of smoke.
RCRA Information	Characterization and proper disposal of this material as a special or hazardous waste is dependent upon Federal, State and local laws and are the user's responsibility. RCRA classification may apply.

SECTION 14: TRANSPORT INFORMATION

49CFR	Not dangerous goods / not hazardous material
IMDG	
UN number	**3082**
Class	9
Packaging group	III
Marine pollutant	YES
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (IMIDACLOPRID SOLUTION)
IATA	
UN number	**3082**
Class	9
Packaging group	III
Environm. Hazardous Mark	YES

Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (IMIDACLOPRID SOLUTION)

This transportation information is not intended to convey all specific regulatory information relating to this product. It does not address regulatory variations due to package size or special transportation requirements.

Freight Classification:	INSECTICIDES OR FUNGICIDES, N.O.I., OTHER THAN POISON

SECTION 15: REGULATORY INFORMATION

EPA Registration No. 432-1312
US Federal Regulations
TSCA list
Glycerine 56-81-5
US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)
None.
SARA Title III - Section 302 - Notification and Information
None.
SARA Title III - Section 313 - Toxic Chemical Release Reporting
None.
US States Regulatory Reporting
CA Prop65
This product does not contain any substances known to the State of California to cause cancer.

This product does not contain any substances known to the State of California to cause reproductive harm.

US State Right-To-Know Ingredients

Glycerine	56-81-5	MN

Canadian Regulations
Canadian Domestic Substance List
Glycerine 56-81-5

Environmental
CERCLA
None.
Clean Water Section 307 Priority Pollutants
None.
Safe Drinking Water Act Maximum Contaminant Levels
None.

International Regulations
European Inventory of Existing Commercial Substances (EINECS)
Glycerine 56-81-5

EPA/FIFRA Information:

Bayer Environmental Science
SAFETY DATA SHEET

MERIT® 2F INSECTICIDE
Version 3.0 / USA
102000015064

10/10
Revision Date: 03/07/2014
Print Date: 03/26/2015

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information required on the pesticide label:

Signal word: Caution!

Hazard statements:
Hazard to humans and domestic animals.
Keep out of reach of children and animals.
Harmful if swallowed or absorbed through skin.
Avoid contact with skin, eyes and clothing.
Avoid breathing spray mist.

SECTION 16: OTHER INFORMATION

NFPA 704 (National Fire Protection Association):
Health - 1 Flammability - 1 Instability - 1 Others - none

HMIS (Hazardous Materials Identification System, based on the Third Edition Ratings Guide)
Health - 1 Flammability - 1 Physical Hazard - 1 PPE -

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard

Reason for Revision: Revised according to the current OSHA Hazard Communication Standard (29CFR1910.1200)

Revision Date: 03/07/2014

This information is provided in good faith but without express or implied warranty. The customer assumes all responsibility for safety and use not in accordance with label instructions. The product names are registered trademarks of Bayer.

Appendix 3A

MARATHON® II

GREENHOUSE and NURSERY INSECTICIDE — SPECIMEN LABEL

For Foliar and Systemic Insect Control on Ornamentals, Fruit and Nut Trees, and Vegetable Plants in Greenhouses, Nurseries and Interior Plantscapes

ACTIVE INGREDIENT:	
* Imidacloprid,1-[(6-Chloro-3-pyridinyl)methyl]-*N*-nitro-2-imidazolidinimine ...	21.4%
OTHER INGREDIENTS:	78.6%
TOTAL:	100.0%

Contains 2 pounds of imidacloprid per gallon

SHAKE WELL BEFORE USING

* Protected by U.S Patent No. 4,742,060

EPA Est. indicated by second and third digits of the batch number on this package.

EPA Reg. No. 432-1369-59807

(65) = 432-TX-1 (03) = 3125-MO-1

STOP - READ THE LABEL BEFORE USE
KEEP OUT OF REACH OF CHILDREN

CAUTION

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Harmful if swallowed or absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Keep children or pets off treated area until spray is dry.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves made of any waterproof material such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinylchloride (PVC) or viton
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering controls statements: When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

Important: When reduced PPE is worn because a closed system is being used, handlers must be provided all PPE specified above for "Applicators and Other Handlers" and have such PPE immediately available for use in an emergency, such as a spill or equipment breakdown.

USER SAFETY RECOMMENDATIONS

User should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

FIRST AID	
IF SWALLOWED	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.
IF INHALED	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. • Call a poison control center or doctor for further treatment advice.
IF ON SKIN OR CLOTHING	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.

Net Contents: 250 Milliliters (8.45 fl. oz.)

ohp Partners with solutions

Appendix 3A

FIRST AID continued	
IF IN EYES	• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
In case of emergency call toll free the OHP, Inc. Emergency Response Telephone No. 800-356-4647. Have a product container or label with you when calling a poison control center or doctor, or going for treatment.	
Note To Physician: No specific antidote is available. Treat the patient symptomatically.	

ENVIRONMENTAL HAZARDS

This product is highly toxic to aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

This chemical demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170.

This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours following application. Earlier entry by exception.

Exception: If the product is drenched, soil-injected or soil-incorporated, workers may enter the treated area at any time if there will be no contact with anything that has been treated.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinylchloride (PVC) or viton
- Shoes plus socks

Do not formulate this product into other end-use products.

APPLICATION TO ORNAMENTALS AND VEGETABLE PLANTS

MARATHON II Insecticide is for insect control on ornamental and vegetable plants in nurseries and greenhouses and interior plantscapes. **MARATHON II Insecticide** is a systemic product and will be translocated upward into the plant system. To assure optimum effectiveness, the product must be placed where the growing portion of the target plant can absorb the active ingredient. The addition of a nitrogen containing fertilizer, where applicable, into the solution may enhance the uptake of the active ingredient. Application can be made by foliar application or soil applications; including soil injection, drenches, chemigation and broadcast sprays.

When making soil applications to plants with woody stems, systemic activity will be delayed until the active ingredient is translocated throughout the plant. For this reason, applications should be made prior to anticipated pest infestation to achieve optimum levels of control.

For outdoor ornamentals, broadcast applications cannot exceed a total of 1.6 pints (0.4 lb of active ingredient) per acre per year.

BARK MEDIA: Media with 30% or more bark content may confer a shorter period of protection when treated with **MARATHON II Insecticide**.

RESISTANCE: Some insects are known to develop resistance to insecticides after repeated use. As with any insecticide, the use of this product should conform to resistance management strategies established for the use area. Consult your Cooperative Extension Service for resistance management strategies and recommended pest management practices for your area.

Application Equipment For Ornamentals And Vegetable Plants

MARATHON II Insecticide mixes readily with water and may be used in many types of application equipment. Mix product with the required amount of water and apply as desired dependent upon the selected use pattern.

When making foliar applications on hard to wet foliage such as holly, pine, or ivy, the addition of a spreader/ sticker is recommended. If concentrate or mist type spray equipment is used, an equivalent amount of product should be used on the area sprayed, as would be used in a dilute application.

MARATHON II Insecticide has been found to be compatible with commonly used fungicides, miticides, liquid fertilizers, and compatibility using the correct proportion of products in a small jar test if local experience is unavailable.

APPLICATION THROUGH IRRIGATION SYSTEMS

MARATHON II Insecticide may be applied at rates recommended on the label either alone or in tank mixtures with other pesticides and chemicals registered for application through irrigation systems. The normal dilution ratio is 1:100 to 1:200, depending on the system. Always meter the product into the irrigation water during the first part of the irrigation cycle. The product may be mixed separately prior to injection. Agitation may be necessary if the mixture is allowed to stand more than 24 hours.

Remove scale, pesticide residue and other foreign matter from the tank and entire irrigation system.

Apply **MARATHON II Insecticide** only through micro irrigation (individual spaghetti tubes), drip irrigation, overhead irrigation, ebb and flood, or hand-held or motorized calibrated irrigation equipment.

Do not apply this product through any other type of irrigation system. Crop injury or lack of effectiveness can result from non uniform distribution of treated water.

Appendix 3A

If you have any questions about calibration, contact your State Extension Service specialist, equipment manufacturers or other experts in this area.

Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place.

A person knowledgeable of the chemigation system and responsible for its operation, or a person who is under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

SAFETY DEVICES FOR IRRIGATION SYSTEMS CONNECTED TO PUBLIC WATER SUPPLIES:

If the source of water for your irrigation system is a public water supply, follow the instructions below:

1. Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.
2. Chemigation systems connected to public water systems must contain a functional, reduced-pressure zone, backflow preventer (RPZ) or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.
3. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
4. The pesticide injection pipeline must contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
5. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.

SAFETY DEVICES FOR IRRIGATION SYSTEMS NOT CONNECTED TO A PUBLIC WATER SUPPLY:

1. The system must contain a functional check valve, vacuum relief valve and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
2. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
3. The pesticide injection pipeline must also contain a functional normally closed solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
5. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where the pesticide distribution is adversely affected.
6. Systems must use a metering pump such as a positive displacement injection pump (e.g. diaphragm pump) effectively designed and constructed of material that is compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.

APPLICATION TO GRASSY AREAS IN NURSERIES

MARATHON II Insecticide can be used for the control of soil inhabiting pests of grassy areas of nurseries, such as Northern and Southern masked chafers, *Cyclocephala borealis*, *C. immaculata*, and/or *C. lurida*; Asiatic garden beetle, *Maladera castanea*; European chafer, *Rhizotroqus majalis*; Green June beetle, *Cotinis nitida*; May or June beetle, *Phyllophaga* spp.; Japanese beetle, *Popillia japonica*; Oriental beetle, *Anomala orientalis*; Billbugs, *Spherophorus* spp.; Annual bluegrass weevil, *Hyperodes* spp.; Black turfgrass ataenius, *Ataenius spretulus* and *Aphodius* spp. and mole crickets, *Scapteriscus* spp. **MARATHON II Insecticide** can also be used for suppression of cutworms and chinchbugs. **MARATHON II Insecticide** can be used as directed on nursery grass in sites such as under or around field or container grown plants, on roadways or other grassy areas in or around nurseries. **MARATHON II Insecticide** cannot be used on commercial sod farms.

The active ingredient in **MARATHON II Insecticide** has sufficient residual activity so that applications can be made preceding the egg laying activity of the target pests. High levels of control can be achieved when applications are made preceding or during the egg laying period. The need for an application can be based on historical monitoring of the site, previous records or experiences, current season adult trapping or other methods. Optimum control will be achieved when applications are made prior to egg hatch of the target pests, followed by sufficient irrigation or rainfall to move the active ingredient through the thatch.

Applications should not be made when grassy areas are waterlogged or the soil is saturated with water. Adequate distribution of the active ingredient cannot be achieved when these conditions exist. The treated grassy area must be in such a condition that the rainfall or irrigation will penetrate vertically in the soil profile. Application cannot exceed a total of 1.6 pints (0.4 lb of active ingredient) per acre per year.

Application Equipment for Use on Grassy Areas in Nurseries

Apply **MARATHON II Insecticide** in sufficient water to provide adequate distribution in the treated area. The use of accurately calibrated equipment normally used for the application of soil insecticides is required. Use equipment which will produce a uniform, course droplet spray, using a low pressure setting to eliminate off target drift. Check calibration periodically to ensure that equipment is working properly.

Appendix 3A

RECOMMENDED APPLICATIONS

CROP	PEST	DOSAGE
Grassy areas of Field & Forest Nurseries	**Larvae of:** Annual bluegrass weevil Asiatic garden beetle Billbugs Black turfgrass ataenius Cutworms (suppression) European chafer Green June beetle Japanese beetle Northern masked chafer Oriental beetle *Phyllophaga* spp. Southern masked chafer	19.2 to 25.6 oz per acre or 0.45 to 0.6 fl oz (13 to 17 mL) per 1000 sq ft.
	Chinchbugs (suppression) Mole crickets	25.6 oz /A or (17 mL) per 1000 sq. ft.

For optimum control of grubs, billbugs and annual bluegrass-weevil, make application prior to egg hatch of the target pest.

Be sure to read "APPLICATION EQUIPMENT" Section of this label.

For suppression of chinchbugs, make application prior to the hatching of the first instar nymphs. For control of mole crickets make application prior to or during the peak egg hatch period. When adults or large nymphs are present and actively tunneling, **MARATHON II Insecticide** application should be accompanied by a curative insecticide. Follow label instructions for other insecticides when tank-mixing.

Consult your local turf, state Agricultural Experiment Station, or State Extension Service Specialist for more specific information regarding timing of application. NOTE: For optimum control, irrigation or rainfall should occur within 24 hours after application to move the active ingredient through the thatch.

Do not apply more than 1.6 pt (0.4 lb of active ingredient) per acre per year. Avoid mowing grass area until after sufficient irrigation or rainfall has occurred so that uniformity of application will not be affected.

RECOMMENDED APPLICATIONS FOR USE ON OR IN ORNAMENTALS

For foliar and systemic insect control in and around field-grown nursery and containers stock, indoor and outdoor ornamentals (including both greenhouse and interior plantscapes) and ornamentals grown in flats, benches or beds.

CROP	PEST	DOSAGE
Trees (including non-bearing fruit and nut) **Shrubs** **Evergreens** **Flowers** **Foliage plants** **Ground covers** **Interior plantscapes** **Vegetable plants***	Adelgids Aphids Japanese beetles (adults) Lacebugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Leafminers Mealybugs Sawfly larvae Thrips (suppression) Whiteflies	1.7 fl. oz. (50mL) per 100 gal of water

Foliar Applications: Start treatments prior to establishment of high pest populations and reapply on an as needed basis.

For resistance management purposes, a **MARATHON II Insecticide** foliar application following a soil application in the same crop is not recommended.

White grub larvae (such as Japanese beetle larvae, Chafers, *Phyllophaga* spp. Asiatic garden beetle, Oriental beetle)	0.45 to 0.6 fl oz (13 to 17 mL) per 1000 sq. ft.

Broadcast Applications: Mix required amount of product in sufficient water to uniformly and accurately cover the area being treated. Do not use less than 2 gallons of water per 1000 sq. ft. For optimum control, irrigate thoroughly to incorporate **MARATHON II Insecticide** into the upper soil profile.

Refer to REMARKS section for use directions specific for "Flowers and Ground Covers" concerning additional use directions.

* Only for use on vegetable plants intended for resale including: Broccoli, Chinese Broccoli, Broccoli Raab, Brussels Sprouts, Cabbage, Chinese Cabbage, Cauliflower, Collards, Eggplant, Ground Cherry, Kale, Kohlrabi, Lettuce, Mustard Greens, Pepinos, Peppers, Potatoes, Rape Greens, Sorghum, Sugarbeets, Tomatillo, and Tomato.

Appendix 3A

RECOMMENDED APPLICATIONS FOR NURSERY, GREENHOUSE AND INTERIORSCAPE PLANTS		
Adelgids	Japanese beetles (adults)	Pine Tip moth larvae
Aphids	Lacebugs	Psyllids
Armored scales (suppression)	Leaf beetles (including elm and viburnum leaf beetles)	Royal palm bugs
Black vine weevil larvae	Leafhoppers (including glassy-winged sharpshooter)	Sawfly larvae
Eucalyptus longhorned borers	Leafminers	Soft scales
Flatheaded borers (including bronze birch and alder borers)	Mealybugs	Thrips (suppression)
		White grub larvae
		Whiteflies

Trees	0.1 to 0.2 fl. oz. (3 to 6 mL) per inch of trunk diameter (D.B.H.)

Soil Injection: GRID SYSTEM: Holes should be spaced on 2.5 foot centers, in a grid pattern, extending to the drip line of the tree. CIRCLE SYSTEM: Apply in holes evenly spaced in circles, (use more than one circle dependent upon the size of the tree) beneath the drip line of the tree extending in from that line. BASAL SYSTEM: Space injection holes evenly around the base of the tree trunk no more than 6 to 12 inches out from the base.

Mix required dosage in sufficient water to inject an equal amount of solution in each hole. Maintain a low pressure and use sufficient solution for distribution of the liquid into the treatment zone. For optimum control, keep the treated area moist for 7 to 10 days. Do not use less than 4 holes per tree.

No Soil Injection Application Allowed in Nassau or Suffolk Counties of New York.

Soil Drench: Uniformly apply the dosage in no less than 10 gallons of water per 1000 square feet as a drench around the base of the tree, directed to the root zone. Remove plastic or any other barrier that will stop solution from reaching the root zone.

For Control of Specified Borers: Application to trees already heavily infested may not prevent the eventual loss of the trees due to existing pest damage and tree stress.

Shrubs	0.1 to 0.2 fl. oz. (3 to 6 mL) per foot of shrub height

Soil Injection: Apply to individual plants using dosage indicated.

Mix required dosage in sufficient water to inject an equal amount of solution in each hole. Maintain a low pressure and use sufficient solution for distribution of the liquid into the treatment zone. Keep the treated area moist for 7 to 10 days. Do not use less than 4 holes per shrub.

No Soil Injection Application Allowed in Nassau or Suffolk Counties of New York.

Soil Drench: Uniformly apply the dosage in no less than 10 gallons of water per 1000 square feet as a drench around the base of the tree, directed to the root zone. Remove plastic or any other barrier that will stop solution from reaching the root zone.

Flowers and Ground Covers	0.45 to 0.6 fl oz (13 to 17 mL) per 1000 sq. ft.

Apply as a broadcast treatment and incorporate into the soil before planting or apply after plants are established. If application is made to established plants, optimum control will be attained if area is irrigated thoroughly after application.

MARATHON II Insecticide Ebb & Flood Application

MARATHON II Insecticide may be applied through Ebb and Flood applications. To assure accurate uptake it is recommended that prior to treatment, a minimum of 10 plants be brought up to a known field capacity and allowed to dry out for one or two days. Re-wet these plant to determine how much water on average each plant will absorb to bring it back at field capacity. Use the volume absorbed per plant (keeping pot sizes uniform) multiplied by the number of pots being treated. Add to this volume a required minimum to flood your smallest treatment area. This should minimize the return back to the storage tank. Re-use the returned volume with subsequent irrigation or nutrients on the same plants.

MARATHON II INSECTICIDE EBB & FLOOD APPLICATIONS		
Adelgids	Leafhoppers (including glassy-winged sharpshooter)	Soft Scales
Aphids	Leafminers	Thrips (suppression)[4]
Armored scales (suppression)	Mealybugs	Whiteflies
Fungus Gnats (larvae only) [1]	Psyllids	White Grub larvae (such as Japanese Beetle, Masked Chafers, European Chafer, Oriental Beetle, Asiatic Garden Beetle)
Japanese Beetles (adults)	Root mealybugs [2]	
Lacebugs	Root Weevil Complex: (such as Apopka Weevil, Black Vine Weevil, Citrus Root Weevil [3])	
Leaf beetles (including elm and viburnum leaf beetles)		

Pot sizes (inches)	Herbaceous species including vegetable plants[5] (one or two plants per pot)	Woody perennials, Herbaceous species including vegetable plants[5] (3 or more plants per pot)
	ML per 100 Plants	ML per 100 Plants
2	1.6 mL	2.5 mL
3	2.5 mL	3.7 mL
4	3.3 mL	5.0 mL
5	4.2 mL	6.3 mL
6	5.0 mL	7.7 mL
7	5.9 mL	9.1 mL
8	6.6 mL	10.0 mL
9	7.4 mL	11.1 mL
10	8.3 mL	12.5 mL
11	9.0 mL	14.3 mL
12	10.0 mL	16.7 mL

1 **Fungus gnat larvae** in the soil will be controlled by drench or incorporation. No adult Fungus Gnat control. Other foliar insect control is achieved by the uptake of **MARATHON II** from a healthy root system translocating the active ingredient up into the plant.

2 **Root Mealybug** control will require a thorough drenching of containerized media. Coverage is essential for control while minimizing the amount of leachate. Rate: 1.7 fl oz (50 mL) in 150 gallons of water.

3 **Citrus Root Weevil:** For use on non-bearing citrus nursery stock.

4 **Thrips** suppression on foliage only. Thrips in buds and flowers will not be suppressed.

5 **Note:** For use on vegetable plants intended for resale only including: Broccoli, Chinese Broccoli, Broccoli Raab, Brussels Sprouts, Cabbage, Chinese Cabbage, Cauliflower, Collards, Eggplant, Ground Cherry, Kale, Kohlrabi, Lettuce, Mustard Greens, Pepinos, Peppers, Potatoes, Rape Greens, Sorghum, Sugarbeets, Tomatillo, and Tomato.

Appendix 3A

RECOMMENDED DRENCH AND IRRIGATION APPLICATIONS

For use only on greenhouse and nursery ornamentals, vegetable plants, and interiorscape plants using soil drenches, micro-irrigation, drip irrigation, overhead irrigation, ebb and flood irrigation, or hand-held or motorized calibrated irrigation equipment.

Pest	Use Pattern		Dosage - MARATHON II		Remarks
Adelgids Aphids Fungus Gnats [1] (larvae only) Japanese Beetles (adults) Lacebugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Leafminers Mealybugs Psyllids Root mealybugs [2] Root Weevil Complex (Such as Apopka Weevil, Black Vine Weevil, Citrus Root Weevil [3]) Soft Scale Thrips (suppression)[4] Whiteflies White Grub larvae (such as Japanese Beetle, Masked Chafers, European Chafer, Oriental Beetle, Asiatic Garden Beetle)	Plants in Containers	Herbaceous Species – including vegetable plants [5] (one or two plants per pot)	Container size (inches) 2 3 4 5 6 7 8 9 10 11 12	No. pots treated with 1.7 fl oz (50 mL) 3000 2000 1500 1200 1000 850 750 675 600 550 500	Use sufficient volume to wet most of the potting medium without loss of liquid from the bottom of the container. Apply according to label directions. Follow application with moderate irrigation. Irrigate carefully during the next 10 days in order to avoid loss of active ingredient due to leaching.
		Woody Perennials	2 3 4 5 6 7 8 9 10 11 12	2000 1350 1000 800 650 550 500 450 400 350 300	
		Herbaceous Species including vegetable plants [5] (three or more plants per pot)	Use the above woody perennial rates		
	Ornamental and vegetable plants [5] grown in flats, benches, or beds		1.7 fl oz (50 mL) per 3000 square feet		Mix required amount in sufficient water to uniformly cover the area being treated. Do not use less than 2 gallons of mixture per 1000 sq. ft. Apply as a broadcast treatment and incorporate into the medium before planting or apply after plants are established. If application is made to established plants, optimum control will be attained if areas are lightly irrigated after application. Allow no leaching or runout for 10 days after application

1 **Fungus gnat larvae** in the soil will be controlled by drench or incorporation. **No adult Fungus Gnat control.** Other foliar insect control is achieved by the uptake of **MARATHON II Insecticide** from a healthy root system translocating the active ingredient up into the plant.

2 **Root Mealybug** control will require a thorough drenching of containerized media. Coverage is essential for control while minimizing the amount of leachate. Rate: 1.7 fl oz (50 mL) in 150 gallons of water.

3 **Citrus Root Weevil:** For use on non-bearing citrus nursery stock.

4 **Thrips** suppression on foliage only. Thrips in buds and flowers will not be suppressed.

5 **Note:** For use on vegetable plants intended for resale only including: Broccoli, Chinese Broccoli, Broccoli Raab, Brussels Sprouts, Cabbage, Chinese Cabbage, Cauliflower, Collards, Eggplant, Ground Cherry, Kale, Kohlrabi, Lettuce, Mustard Greens, Pepinos, Peppers, Potatoes, Rape Greens, Sorghum, Sugarbeets, Tomatillo, and Tomato.

Appendix 3A

RECOMMENDED DRENCH AND IRRIGATION APPLICATIONS
For use only on greenhouse and, nursery ornamentals, vegetable plants, and interiorscape plants using soil drenches, micro -irrigation, drip irrigation, overhead irrigation, ebb and flood irrigation, or hand-held or motorized calibrated irrigation equipment.

APPLICATION INSTRUCTIONS: Use 1.7 fl oz (50 mL) of product in an appropriate amount of water to avoid leaching to treat the number of pots based on pot size in the table below.

Pest	Use Pattern	Dosage - MARATHON II		Remarks
Adelgids Aphids Fungus Gnats Larvae [1] Japanese Beetle (adult) Lacebugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy winged sharpshooter) Leafminers Mealybugs Psyllids Root Mealybugs [2] Root Weevil Complex (such as: Apopka Weevil, Black Vine Weevil, Citrus Root Weevil [3]) Soft Scale Thrips (suppression) [4] Whiteflies **White Grub larvae** (such as: Japanese Beetle, Masked Chafers, European Chafer, Oriental Beetle, Asiatic Garden Beetle)	Containerized plants	Container Size 1 gallon 2 gallon 3 gallon 5 gallon 7 gallon 10 gallon 15 gallon 20 gallon	No. pots treated with 1.7 fl oz (50 mL) 340 to 244 280 to 210 220 to 165 160 to 110 100 to 75 60 to 45 40 to 30 20 to 15	Apply in sufficient water to wet the potting medium. For optimum control, make applications prior to egg hatch of the target pest. Irrigate moderately after application to move the active ingredient into the root zone.
White Grub larvae (such as: Japanese Beetle, Masked Chafers, European Chafer, Oriental Beetle, Asiatic Garden Beetle)	Field and Forest Nurseries	Apply as a uniform band on either side of the row using a band width six (6) inches wider than the actual root ball diameter to be dug. Do not allow bands in adjacent rows to overlap. Use 1.7 fl oz (50 mL) per 1000 ft of row or 3,000 sq. ft. For grub control in areas of turf, apply as a broadcast application using 1.35 to 1.7 fl oz (40 to 50 mL) per 3000 sq. ft.		Vegetation in the area to be treated should be mowed to a height of 3 inches or less prior to application. Mowing to the lowest possible height will insure greater consistency of control. Apply May through July. For optimum control, treatment should be followed by rainfall or irrigation. Do not use less than 2 gallons of spray volume per 1000 square feet.

1 **Fungus gnat larvae** in the soil will be controlled by drench or incorporation. **No adult Fungus Gnat control**. Other foliar insect control is achieved by the uptake of **MARATHON II Insecticide** from a healthy root system translocating the active ingredient up into the plant.

2 **Root Mealybug** control will require a thorough drenching of containerized media. Coverage is essential for control while minimizing the amount of leachate. Rate: 1.7 fl oz (50 mL) in 150 gallons of water.

3 **Citrus Root Weevil**: For use on non-bearing citrus nursery stock.

4 **Thrips** suppression on foliage only. Thrips in buds and flowers will not be suppressed.

Appendix 3A

RESTRICTIONS

Do not graze treated areas or use clippings for treated areas for feed or forage. Avoid runoff or puddling of irrigation water following application.

Do not apply **MARATHON II Insecticide** to soils which are water logged or saturated, which will not allow penetration into the root zone of the plants.

Do not allow leachate run out for the first 10 days after application, in order to retain the product and facilitate full plant uptake of the active ingredient.

For outdoor ornamentals grown in beds or turf, applications of **MARATHON II Insecticide** cannot exceed a total of 1.6 pt (0.4 lb of active ingredient) per acre per year.

Food Crops: Treated areas may be replanted with any crop specified on an imidacloprid label, or with any crop for which a tolerance exists for the active ingredient.

For crops not listed on an imidacloprid label, or for crops for which no tolerances for the active ingredient have been established, a 12 month plant-back interval should be observed.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

Pesticide Storage: Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food and feed. Store in original container and out of the reach of children, preferably in a locked storage area.

Handle and open container in a manner as to prevent spillage. If the container is leaking, invert to prevent leakage. If container is leaking or material spilled for any reason or cause, carefully dam up spilled material to prevent runoff. Refer to Precautionary Statement on label for hazards associated with the handling of this material. Do not walk through spilled material. Absorb spilled material with absorbing type compounds and dispose of as directed for pesticides below. In spill or leak incidents, keep unauthorized people away. The OHP, Inc. Emergency Response Telephone number is 800-356-4647, or contact Chemtrec at 800-424-9300.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of the smoke.

IMPORTANT: READ BEFORE USE

Read the entire Directions for Use, Conditions, Disclaimer of Warranties and Limitations of liability before using this product.

If terms are not acceptable, return the unopened product container at once. By using this product, user or buyer accepts the following conditions, disclaimer of warranties and limitations of liability.

CONDITIONS: The directions for use of this product are believed to be adequate and should be followed carefully. However, because of manner of use and other factors beyond OHP, Inc.'s control it is impossible for OHP, Inc. to eliminate all risks associated with the use of this product. As a result, crop injury or ineffectiveness is always possible. All such risks shall be assumed by the user of buyer.

DISCLAIMER OF WARRANTIES: OHP, INC. MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, THAT EXTEND BEYOND THE STATEMENTS MADE ON THIS LABEL. No agent of OHP, Inc. is authorized to make any warranties beyond those contained herein or to modify the warranties contained herein. OHP, Inc. disclaims any liability whatsoever for special, incidental or consequential damages, resulting from the use or handling of this product.

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This Product is specially formulated and sold under license from Bayer only for the uses set forth on this label. The active ingredient of this product, formulations containing this active ingredient, and/or methods of making or using this active ingredient or its formulations may be the subject of one or more Bayer patents, including but not limited to U.S. Patent No. 4,742, 060. The purchase and/or use of this product constitutes acceptance of a limited license to use this product only in strict accordance with the instructions set forth on this label. Any use of this product other than as expressly set forth on this label is prohibited and is not licensed through the purchase and/or use of this product and may result in the infringement of one or more Bayer patents and/or other intellectual property rights.

Marathon is a registered trademark of OHP, Inc.

Manufactured for:
OHP, Inc.
P. O. Box 230
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(800) 356-4647

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OHP985250

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SAFETY DATA SHEET

Revision Date: 03/07/2014
Print Date: 05/04/2015

MARATHON® II GREENHOUSE AND NURSERY INSECTICIDE

EPA Registration Number: 432-1369-59807

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product identifier

Trade name. . . . . : MARATHON® II GREENHOUSE AND NURSERY INSECTICIDE

EPA Registration No.. . . . . : 432-1369-59807

Relevant identified uses of the substance or mixture and uses advised against

Use . . . . . : Insecticide

Restrictions on use . . . . . : See product label for restrictions.

Company Information . . . . : OHP, Inc.
PO Box 51230
Mainland, PA 19451
(800) 659-6745

TRANSPORTATION EMERGENCY (24 hours a day) call . . . . . : Chemtrec: 1-800-424-9300

MEDICAL EMERGENCY (24 hours a day) and Product Information call . . . . . : 1-800-356-4647

SDS Information or Request. . . . . : ohp.com

2. HAZARDS IDENTIFICATION

Classification in accordance with regulation HCS 29CFR §1910.1200

Eye irritation. . . . . : Category 2B

Signal word . . . . . : Warning

Hazard statements. . . . . : Causes eye irritation.

Precautionary statements

Wash thoroughly after handling.

IF IN EYES . . . . . : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists . . . : Get medical advice/ attention.

Other hazards . . . . . : No other hazards known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Component Name	CAS-No.	Average % by weight
Imidacloprid	138261-41-3	21.40
Glycerine	56-81-5	10.00

4. FIRST AID MEASURES

Description of first aid measures

General advice. . . . . : When possible, have the product container or label with you when calling a poison control center or doctor or going for treatment.

Inhalation . . . . . : Move to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a physician or poison control center immediately.

Skin contact . . . . . : Take off contaminated clothing and shoes immediately. Wash off immediately with plenty of water for at least 15 minutes. Call a physician or poison control center immediately.

Eye contact. . . . . : Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a physician or poison control center immediately.

Ingestion. . . . . : Call a physician or poison control center immediately. Rinse out mouth and give water in small sips to drink. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Do not leave victim unattended.

Most important symptoms and effects, both acute and delayed

Symptoms . . . . . : To date no symptoms are known.

Indication of any immediate medical attention and special treatment needed

Treatment . . . . . : Appropriate supportive and symptomatic treatment as indicated by the patient's condition is recommended. There is no specific antidote.

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5. FIREFIGHTING MEASURES

Extinguishing media

Suitable. . . . . : Water spray, Foam, Carbon dioxide (CO2), Dry chemical

Unsuitable . . . . . : None known.

Advice for firefighters

Special protective equipment for fire-fighters. . . . . : Firefighters should wear NIOSH approved self-contained breathing apparatus and full protective clothing.

Further information. . . . . : Keep out of smoke. Fight fire from upwind position. Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses.

Flash point . . . . . : > 93 °C

Autoignition temperature . : no data available

Lower explosion limit . . . . : no data available

Upper explosion limit . . . . : no data available

Explosivity . . . . . : not applicable

Dust explosion class. . . . . : Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Precautions . . . . . : Keep unauthorized people away. Isolate hazard area. Avoid contact with spilled product or contaminated surfaces.

Methods and materials for containment and cleaning up

Methods for cleaning up . . : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Collect and transfer the product into a properly labelled and tightly closed container. Clean contaminated floors and objects thoroughly, observing environmental regulations.

Additional advice. . . . . : Use personal protective equipment. Do not allow to enter soil, waterways or waste water canal.

Reference to other sections . . . . . : Information regarding safe handling, see section 7.
Information regarding personal protective equipment, see section 8.
Information regarding waste disposal, see section 13.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling . .: Handle and open container in a manner as to prevent spillage. Maintain exposure levels below the exposure limit through the use of general and local exhaust ventilation.

Hygiene measures. . . . . : Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics.

Remove Personal Protective Equipment (PPE) immediately after handling this product. Before removing gloves clean them with soap and water. Remove soiled clothing immediately and clean thoroughly before using again. Wash thoroughly and put on clean clothing.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers . . . . . : Store in a cool, dry place and in such a manner as to prevent cross contamination with other crop protection products, fertilizers, food, and feed. Store in original container and out of the reach of children, preferably in a locked storage area.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Components	CAS-No.	Control parameters	Update	Basis
Imidacloprid	138261-41-3	0.7 mg/m3 (TWA)		OES BCS*
Imidacloprid	138261-41-3	5ug/m3 (AN ESL)	07 2011	TX ESL
Imidacloprid	138261-41-3	50ug/m3 (ST ESL)	07 2011	TX ESL
Glycerine (Total dust.)	56-81-5	15 mg/m3 (PEL)	02 2006	OSHA Z1
Glycerine (Respirable fraction.)	56-81-5	5 mg/m3 (PEL)	02 2006	OSHA Z1
Glycerine (Respirable fraction.)	56-81-5	5 mg/m3 (TWA)	1989	OSHA Z1A

EXPOSURE CONTROLS / PERSONAL PROTECTION *continued next page*

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Control parameters *continued*

Components	CAS-No.	Control parameters	Update	Basis
Glycerine (Total dust.)	56-81-5	10 mg/m3 (TWA)	1989	OSHA Z1A
Glycerine (Total dust and mist.)	56-81-5	10 mg/m3 (TWA)	06 2008	TN OEL
Glycerine (Respirable fraction and dust or fume.)	56-81-5	5 mg/m3 (TWA)	06 2008	TN OEL
Glycerine (Particulate.)	56-81-5	50ug/m3 (ST ESL)	02 2013	TX ESL
Glycerine (Particulate.)	56-81-5	5ug/m3 (AN ESL)	02 2013	TX ESL
Glycerine (Vapor.)	56-81-5	100ug/m3 (AN ESL)	02 2013	TX ESL
Glycerine (Vapor.)	56-81-5	1000ug/m3 (ST ESL)	02 2013	TX ESL

*OES BCS: Internal Bayer CropScience "Occupational Exposure Standard"

Exposure controls

Personal protective equipment
In normal use and handling conditions please refer to the label and/or leaflet. In all other cases the following recommendations would apply.

Respiratory protection . . . : When respirators are required, select NIOSH approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industry recommendations.

Hand protection . . . . . : Chemical resistant nitrile rubber gloves

Eye protection . . . . . : Tightly fitting safety goggles

Skin and body protection . : Wear long-sleeved shirt and long pants and shoes plus socks.

General protective measures . . . . . : Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and warm/tepid water.

Keep and wash PPE separately from other laundry.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance . . . . . : white to light beige

Physical State . . . . . : liquid suspension

Odor . . . . . : mild

Odour Threshold . . . . . : no data available

pH . . . . . : 7.5

Vapor Pressure . . . . . : no data available

Vapor Density (Air = 1) . . . . : no data available

Density . . . . . : 1.12 g/cm³ at 20 °C

Evapouration rate . . . . . : no data available

Boiling Point . . . . . : no data available

Melting / Freezing Point . . . : -6.7 °C / 19.9 °F

Water solubility . . . . . : dispersible

Minimum Ignition Energy . . : not applicable

Decomposition temperature . . . . . : no data available

Partition coefficient: n-octanol/water . . . . . : no data available

Viscosity . . . . . : 350 - 600 mPa.s

Flash point . . . . . : > 93 °C

Autoignition temperature . . : no data available

Lower explosion limit . . . . . : no data available

Upper explosion limit . . . . . : no data available

Explosivity . . . . . : not applicable

Dust explosion class . . . . . : Not applicable.

10. STABILITY AND REACTIVITY

Reactivity

Thermal decomposition . . : no data available

Chemical stability . . . . . : Stable under recommended storage conditions.

Possibility of hazardous reactions . . . . . : No dangerous reaction known under conditions of normal use.

Conditions to avoid . . . . . : freezing

Incompatible materials . . . : no data available

Hazardous decomposition products . . . . . : No decomposition products expected under normal conditions of use.

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11. TOXICOLOGICAL INFORMATION

Exposure routes . . . . . : Ingestion, Skin Absorption, Eye contact, Inhalation

Immediate Effects

Eye . . . . . : May cause mild irritation to eyes.

Skin . . . . . : May cause slight irritation. Harmful if absorbed through skin.

Ingestion . . . . . : Harmful if swallowed.

Information on toxicological effects

Acute oral toxicity . . . . . : LD50 (male rat) > 4,870 mg/kg
LD50 (female rat) 4,143 mg/kg

Acute inhalation toxicity . . : LC50 (male/female combined rat) > 5.33 mg/l
Exposure time: 4 h
Determined in the form of liquid aerosol.
(actual)

LC50 (male/female combined rat) > 20 mg/l
Exposure time: 1 h

Determined in the form of liquid aerosol.
Extrapolated from the 4 hr LC50.
(actual)

Acute dermal toxicity . . . . : LD50 (male/female combined rabbit) > 2,000 mg/kg

Skin irritation . . . . . : No skin irritation (rabbit)

Eye irritation . . . . . : Minimally irritating. (rabbit)

Sensitisation . . . . . : Non-sensitizing. (guinea pig)

Assessment repeated dose toxicity
Imidacloprid did not cause specific target organ toxicity in experimental animal studies.

Assessment Mutagenicity
Imidacloprid was not mutagenic or genotoxic based on the overall weight of evidence in a battery of in vitro and in vivo tests.

Assessment Carcinogenicity
Imidacloprid was not carcinogenic in lifetime feeding studies in rats and mice.

ACGIH . . . . . : None.

NTP . . . . . : None.

IARC . . . . . : None.

OSHA . . . . . : None.

Assessment toxicity to reproduction
Imidacloprid caused reproduction toxicity in a two-generation study in rats only at dose levels also toxic to the parent animals. The reproduction toxicity seen with Imidacloprid is related to parental toxicity.

Assessment developmental toxicity
Imidacloprid caused developmental toxicity only at dose levels toxic to the dams. The developmental effects seen with Imidacloprid are related to maternal toxicity.

Further information

Only acute toxicity studies have been performed on the formulated product.

The non-acute information pertains to the active ingredient(s).

12. ECOLOGICAL INFORMATION

Toxicity to fish . . . . . : LC50 (Rainbow trout (Oncorhynchus mykiss)) 211 mg/l
Exposure time: 96 h
The value mentioned relates to the active ingredient imidacloprid.

Toxicity to aquatic invertebrates . . . . . : EC50 (Water flea (Daphnia magna)) 85 mg/l
Exposure time: 48 h
The value mentioned relates to the active ingredient imidacloprid.

LC50 (Chironomus riparius (non-biting midge)) 0.0552 mg/l
Exposure time: 24 h
The value mentioned relates to the active ingredient imidacloprid.

***ECOLOGICAL INFORMATION** continued next page*

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ECOLOGICAL INFORMATION continued

Toxicity to aquatic plants EC50 (Desmodesmus subspicatus) > 10 mg/l Growth rate; Exposure time: 72 h
The value mentioned relates to the active ingredient imidacloprid.

Biodegradability : Imidacloprid: not rapidly biodegradable

Koc : Imidacloprid: Koc: 225

Bioaccumulation : Imidacloprid: Does not bioaccumulate.

Mobility in soil : Imidacloprid: Moderately mobile in soils

Environmental precautions : Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark.

Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water.

Apply this product as specified on the label.

Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Product : Do not contaminate water, food, or feed by disposal.

Dispose in accordance with all local, state/provincial and federal regulations.

Contaminated packaging : Do not re-use empty containers.

Triple rinse containers.

Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration, or if allowed by State and Local authorities, by burning.

If burned, stay out of smoke.

RCRA Information : Characterization and proper disposal of this material as a special or hazardous waste is dependent upon Federal, State and local laws and are the user's responsibility. RCRA classification may apply.

14. TRANSPORT INFORMATION

49CFR : Not dangerous goods / not hazardous material

IMDG

UN number : 3082

Class : 9

Packaging group : III

Marine pollutant : YES

Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (IMIDACLOPRID SOLUTION)

IATA

UN number : 3082

Class : 9

Packaging group : III

Environm. Hazardous Mark: YES

Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (IMIDACLOPRID SOLUTION)

This transportation information is not intended to convey all specific regulatory information relating to this product. It does not address regulatory variations due to package size or special transportation requirements.

Freight Classification : INSECTICIDES OR FUNGICIDES, N.O.I., OTHER THAN POISON

15. REGULATORY INFORMATION

EPA Registration No. : 432-1369-59807

US Federal Regulations
TSCA list
Glycerine 56-81-5

US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D) : None.

SARA Title III - Section 302 - Notification and Information : None.

SARA Title III - Section 313 - Toxic Chemical Release Reporting : None.

US States Regulatory Reporting

CA Prop65
This product does not contain any substances known to the State of California to cause cancer.

REGULATORY INFORMATION continued next page

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REGULATORY INFORMATION continued

This product does not contain any substances known to the State of California to cause reproductive harm.

US State Right-To-Know Ingredients

Glycerine	56-81-5	MN

Canadian Regulations

Canadian Domestic Substance List

Glycerine	56-81-5

Environmental

CERCLA . . . . . : None.

Clean Water Section 307 Priority Pollutants . . . . . : None.

Safe Drinking Water Act Maximum Contaminant Levels. . . . . : None.

International Regulations

European Inventory of Existing Commercial Substances (EINECS)

Glycerine	56-81-5

EPA/FIFRA Information:

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information required on the pesticide label:

Signal word . . . . . : Caution!

Hazard statements. . . . . : Hazard to humans and domestic animals.

Keep out of reach of children and animals.

Harmful if swallowed or absorbed through skin.

Avoid contact with skin, eyes and clothing.

Avoid breathing spray mist.

16. OTHER INFORMATION

NFPA 704 (National Fire Protection Association):

Health - 1 Flammability - 1 Instability - 1 Others - none

HMIS (Hazardous Materials Identification System, based on the Third Edition Ratings Guide)

Health - 1 Flammability - 1 Physical Hazard - 1 PPE -

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard

Reason for Revision . . . . . : Revised according to the current OSHA Hazard Communication Standard (29CFR1910.1200)

Revision Date. . . . . : 03/07/2014

This information is provided in good faith but without express or implied warranty. The customer assumes all responsibility for safety and use not in accordance with label instructions.

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PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Causes moderate eye irritation. Harmful if swallowed, inhaled, or absorbed through skin. Avoid contact with skin, eyes or clothing. Avoid breathing spray mist. Wear long sleeved shirt, long pants, shoes plus socks and chemical resistant gloves made of any waterproof material when mixing or handling concentrate. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

ENVIRONMENTAL HAZARDS

Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

FIRST AID

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a Poison Control Center or doctor for treatment advice.

IF ON SKIN: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a Poison Control Center or doctor for treatment advice.

IF SWALLOWED: Call a Poison Control Center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a Poison Control Center or doctor. Do not give anything to an unconscious person.

IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance then give artificial respiration, preferably mouth-to-mouth if possible. Call a Poison Control Center or doctor for further treatment advice.

Have the product container or label with you when calling a Poison Control Center or doctor or going for treatment.

CONDITIONS OF SALE AND WARRANTY

Creative Marketing & Research, Inc. warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated when used in accordance with the use directions under normal conditions. Creative Marketing & Research, Inc. neither makes, nor authorizes any agent or representative to make, any other warranties, express or implied, including fitness or merchantability.

The directions for use of this product are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as timing and method of application, weather and crop conditions, presence of other materials, or other influencing factors, all of which are beyond the control of Creative Marketing & Research, Inc. and Seller. Buyer and user acknowledge and assume all risks and liability resulting from the handling, storage and use of this material not in strict accordance with directions given herewith. In no case shall Creative Marketing & Research, Inc. or the Seller be liable for consequential, special, indirect, or incidental damages or losses resulting from the handling or use of this product. The foregoing is a condition of sale by Creative Marketing & Research, Inc. and is accepted as such by the Buyer.

NO FOAM B

SPREADER • ACTIVATOR • BUFFER

COMBINED ANIONIC- NONIONIC SURFACTANT BLEND FOR TERRESTRIAL / AQUATIC USE SITES

PRINCIPAL FUNCTIONING AGENTS:	
Octyl phenoxy polyethoxy ethanol, Linear alykyl sulfonates, Ethanolamine	25%
CONSTITUENTS INEFFECTIVE AS SPRAY ADJUVANT:	75%
TOTAL:	100%

CA Reg. No. 1050775-50008-AA

KEEP OUT OF REACH OF CHILDREN

CAUTION

See side panel for additional Precautionary Statements

NET CONTENTS: 5 GALLONS / 18.9 LITERS

Manufactured by

CREATIVE MARKETING & RESEARCH, INC.
P.O. Box 35000 • Fresno, CA 93745-5000
(559) 499-2100

DIRECTIONS FOR USE

NO FOAM B is designed to increase the efficiency of acaracides, defoliants, desiccants, fungicides, herbicides and insecticides, especially organophosphate pesticides. It assures quick wetting and uniform coverage of spray applications. NO FOAM B may be used on agricultural, forestry, turf and ornamental, industrial, structural and non-cropland sites. It should also be used to buffer highly alkaline water.

NO FOAM B is formulated from materials which do not tend to burn foliage or leave harmful residues. There will be no excessive foaming when high pressures are used.

Read and follow the precautions, restrictions and recommendations on the labels of pesticides used with NO FOAM B. Use according to the most restrictive label directions for each product in any tank mix.

COMPATIBILITY: NO FOAM B is compatible with most pesticides. However, if the desired combination has not been previously used, a compatibility test is recommended.

MIXING: Shake well before using. Fill spray tank ½ full of water and begin agitation. Add the recommended amount of NO FOAM B. Add pesticides as directed by label or in the following sequence and continue filling tank: (1) Dry flowables or water dispersing granules, (2) Wettable powders, (3) Flowables, (4) Solutions, (5) Emulsifiable concentrates. Continue agitation until spray solution is completely mixed. Continuous agitation of finished spray is recommended. If spray solution has been allowed to stand, thoroughly agitate and remix before application.

RECOMMENDATIONS: Proper quantity to use will vary with the type of equipment, water volume per acre, temperature, type of foliage to be wet, and the pesticide formulation. Also, higher rates than those below may be used if recommended by pesticide labeling. Follow pesticide label directions. However, do not add this product at a rate which exceeds 5% of the finished spray volume.

AIR or GROUND: Use ½-3 pints per 100 gallons of finished spray solution. For improved efficacy, use at least ½ pint per acre when finished spray volume is less than 20 gallons per acre. For backpack or hand held sprayers, use 1 fl. oz. per gallon of finished spray solution.

STORAGE AND DISPOSAL

DO NOT CONTAMINATE WATER, FOOD OR FEED BY STORAGE OR DISPOSAL

STORAGE: Store in original container away from children, animals, foods, feeds and seeds. Handle in accordance with Precautionary Statements. In the event of spillage or leakage, soak up the material with absorbent clay, sand, sawdust or other absorbent material. Scrape up and dispose in accordance with Product Disposal. **PRODUCT DISPOSAL:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. **CONTAINER DISPOSAL:** Triple rinse (or equivalent) during mixing and loading. Recycling decontaminated containers is the best option of container disposal. The Agricultural Container Recycling Council (ACRC) operates the national recycling program. To contact your state or local ACRC recycler, visit the ACRC web page at www.acrecycle.org. Decontaminated containers may also be disposed of in a sanitary landfill.

0381/0504(07)

Appendix 3A

Appendix 3A

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Chemical Product
NO FOAM® B
CA Reg. No.: 1050775-50008
Common Name: Surfactant (Adjuvant).
Chemical Description: Liquid mixture of anionic and nonionic surfactants.
TSCA/CAS No.: This product is a mixture — there is no specific CAS number.

Manufactured By
Creative Marketing & Research
P. O. Box 35000
Fresno, CA 93745-5000

Emergency Phone Numbers
Emergency Telephone: DAYS: (559) 499-2100 EVES.: (559) 431-7390
CHEMTREC (24-Hour Emergency Number): (800) 424-9300
EPA National Response Center: (800) 424-8802

SECTION 2. HAZARDOUS INGREDIENTS

CHEMICAL	CAS NO.	%	TLV OR PEL	RQ (lbs)
POE Nonylphenol	26027-38-3	12.86	*N.A.	*N.P.
Dodecylbenzene sulfonate	27176-87-0	5.7	N.A.	1,000
Isopropyl alcohol	67-63-0	2.1	400 ppm (PEL)	N.P.
Sodium xylene sulfonate	1300-72-7	<1.0	N.A.	N.P.

* N.A. - Not Available.
* N.P. - Not Pertinent.

SECTION 3. EMERGENCY/HAZARDS OVERVIEW

Viscous, green liquid with slight rancid odor. Avoid contact with strong alkalies at high temperatures, acids, oxidizing agents, or materials reactive with hydroxyl compounds. Burning may result in formation of carbon oxides, sulfur dioxide and hydrogen sulfide. Contain any liquid runoff. Not D.O.T. regulated.

HEALTH: 1 REACTIVITY: 0 FLAMMABILITY: 0 ENVIRONMENT: 1

(0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme)

SECTION 4. FIRST AID

Eyes: Immediately flush eyes with plenty of water and get medical attention.
Skin: Immediately wash skin with plenty of soap and water while removing contaminated clothing and shoes. If irritation persists, seek medical attention.
Ingestion: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water. If so advised by a physician or Poison Control Center, induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person.
Inhalation: Remove victim to fresh air.

SECTION 5. FIRE AND EXPLOSION HAZARDS

Flash Point:	204°F.
Test Method:	ASTM-D93
LEL Flammable Limits:	Not pertinent.
UEL Flammable Limits:	Not pertinent.
Autoignition Temperature:	Not pertinent.
Flammability Classification:	Non-flammable.
Known Hazardous Products of Combustion:	None.
Properties that Initiate/Contribute to Intensity of Fire:	None.
Potential For Dust Explosion:	None.
Reactions that Release Flammable Gases or Vapors:	Not known.
Potential For Release of Flammable Vapors:	None.
Unusual Fire & Explosion Hazards:	Burning may result in formation of carbon oxides.
Extinguishing Media:	Foam, CO_2, dry chemical, water.
Special Firefighting Procedures:	Wear positive pressure, self-contained breathing apparatus and goggles. Avoid smoke inhalation. Contain any liquid runoff.

SECTION 6. SPILLS AND LEAKS

Containment:	Prevent product spillage from entering drinking water supplies or streams.
Clean Up:	Collect liquid or absorb onto absorbent material and package for disposal.
Evacuation:	Not necessary.

SECTION 7. STORAGE AND HANDLING

Storage:	Store in plastic or stainless steel container in a cool, well-ventilated, dry place at temperatures above 40°F. Keep away from strong alkalies, acids and/or oxidizing agents. Do not store near food or feeds. Do not stack pallets more than two (2) high.
Transfer Equipment:	Transfer product using chemical-resistant plastic or stainless steel tanks, pumps, valves, etc.
Work/Hygienic Practices:	Harmful if swallowed. May cause irritation of eyes, nose, throat and skin. Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Wash thoroughly before reuse. Do not contaminate feed and foodstuffs. Do not apply this product in such a manner as to directly or through drift expose workers or other persons. The area being treated must be vacated by unprotected persons.

SECTION 8. PERSONAL PROTECTIVE EQUIPMENT

Eyes:	Chemical dust/splash goggles or full-face shield to prevent eye contact. As a general rule, do not wear contact lenses when handling.
Skin:	Impervious gloves and clothes.
Respiratory:	Not normally needed. If use generates an aerosol mist or respiratory irritation, use NIOSH-approved dust/mist respirator (such as 3M #8710).
Ventilation:	Recommended but no TLV established.

Appendix 3A

SECTION 9. PHYSICAL AND CHEMICAL DATA

Appearance:	Viscous, green liquid.
Odor:	Slight rancid odor.
pH:	2.5
Vapor Pressure:	0.75 (psi)
Vapor Density (Air = 1):	>1.0
Boiling Point:	88.9°C (192°F)
Freezing Point:	Not available.
Water Solubility:	Miscible.
Density:	8.76 lbs./gal.
Evaporation Rate:	Not available.
Viscosity:	Not available.
% Volatile:	Not available.
Octanol/Water Partition Coefficient:	Not available.
Saturated Vapor Concentration:	Not available.

SECTION 10. STABILITY AND REACTIVITY

Stability:	Stable.
Conditions To Avoid:	Avoid contact with strong alkalies at high temperatures, acids, oxidizing agents, or materials reactive with hydroxyl compounds.
Incompatibility:	Not available.
Hazardous Decomposition Products:	Burning may result in formation of carbon oxides.
Hazardous Polymerization:	Will not occur.

SECTION 11. POTENTIAL HEALTH EFFECTS

Acute Effects:

Eyes:	Mild irritant. Vapors or mist may cause redness and burning.
Skin:	Mild irritant, especially from prolonged exposure. Causes redness, drying and cracking.
Ingestion:	LD_{50} (Rat) > 5000 kg/mg.
Inhalation:	None expected but aerosol mist may cause mild irritation of nasal mucous membranes.
Subchronic Effects:	None known.
Chronic Effects:	None known.

SECTION 12. ECOLOGICAL INFORMATION

Algal/Lemna Growth Inhibition:	Not known.
Toxicity to Fish and Invertebrates:	Not known.
Toxicity to Plants:	Not known.
Toxicity in Birds:	Not known.

SECTION 13. DISPOSAL

Do not contaminate lakes, streams, ponds, estuaries, oceans or other waters by discharge of waste effluents or equipment washwaters. Dispose of waste effluents in accordance with state and local waste disposal regulations. Also, chemical additions or other alterations of this product may invalidate any disposal information in this MSDS. Therefore, consult local waste regulators for proper disposal.

SECTION 14. TRANSPORTATION

D.O.T.:	Not D.O.T. Regulated.
Other Shipping Description:	Adhesives, Adjuvants, Spreaders or Stickers, Liquid. NMFC Item 4612, LTL Class 60

SECTION 15. REGULATORY INFORMATION

CERCLA: Dodecylbenzene sulfonate is listed as a priority pollutant under the Clean Water Act and, as such, falls under the CERCLA spill reporting requirements of 40 CFR 302.

SARA TITLE III, Section 313 Toxic Chemicals: Isopropyl alcohol (2.1%).

PROPOSITION 65 (CA): None.

SECTION 16. OTHER

All information appearing in this document was based on data provided by third party sources and was compiled to comply with the Federal Hazard Communication Standard and the California Hazardous Substances Information and Training Act. The information is believed to be accurate as of the preparation date, but is not warranted as being the final authority in the use of this product. This information does not purport to be legal or medical advice.