Department of Pesticide Regulation

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California Notice 2014-05

SEMIANNUAL REPORT SUMMARIZING THE REEVALUATION STATUS OF PESTICIDE PRODUCTS DURING THE PERIOD OF July 1, 2013 THROUGH December 31, 2013

California regulations require the Department of Pesticide Regulation (DPR) to investigate reports of possible adverse effects to people or the environment resulting from the use of pesticides. Reevaluation of a registered pesticide is required if a significant adverse impact occurred, or is likely to occur, from its use.

Title 3, California Code of Regulations (3 CCR), section 6221, specifies a number of factors under which DPR may initiate a reevaluation: (a) public or worker health hazard, (b) environmental contamination, (c) residue over tolerance, (d) fish or wildlife hazard, (e) lack of efficacy, (f) undesirable phytotoxicity, (g) hazardous packaging, (h) inadequate labeling, (i) disruption of the implementation or conduct of pest management, (j) other information suggesting a significant adverse effect, (k) availability of an effective and feasible alternative material or procedure that is demonstrably less destructive to the environment, and (l) discovery that data upon which a registration was issued is false, misleading, or incomplete. Often, an ongoing DPR pesticide review triggers a reevaluation. Reevaluation triggers also include data or information received from State and county pesticide use surveillance and illness investigations, pesticide residue sample analyses, environmental monitoring activities, and other state or federal agencies.

When a pesticide enters the reevaluation process, DPR reviews existing data and may require registrants to provide additional data to determine the nature and extent of the potential hazard or identify appropriate mitigation measures, if needed.

DPR concludes reevaluations in a number of different ways. If the data demonstrates use of the pesticide presents no significant adverse effects, DPR concludes the reevaluation without additional mitigation measures. If additional mitigation measures are necessary, DPR places appropriate restrictions on the use of the pesticide to mitigate the potential adverse effect. If the adverse impact cannot be mitigated, DPR cancels or suspends the registration of the pesticide product(s).

This report complies with the requirement of 3 CCR section 6225, which requires DPR to prepare a semiannual report describing pesticides evaluated, under reevaluation, or for which factual or scientific information was received, but no reevaluation was initiated. The report contains two sections:

I. Formal Reevaluation - initiated when an investigation indicates a significant adverse impact has occurred or is likely to occur (see page 2); and

II. Preliminary Investigations (Evaluations) - product(s) and/or active ingredient(s) for which DPR receives possible adverse factual or scientific information, but no reevaluation has been initiated (page 16).

I. FORMAL REEVALUATION

Formal reevaluation is initiated when investigations indicate a significant adverse impact has occurred or is likely to occur. This section of the report intends to provide stakeholders with a summarizing description of each reevaluation in the following four areas: (1) *Basis and Scope*, (2) *Data Requirements* (if any), (3) *Summary* (e.g., study design, protocol development, protocol submission and review, study/data submission and evaluation, new product roll-in, DPR analysis papers, risk assessments), and (4) *Mitigation Efforts and Status*.

ANTIFOULING PAINT PESTICIDES (COPPER-BASED) – 197 Products

Basis and Scope: On June 1, 2010, DPR placed into reevaluation antifouling paint (AFP) pesticide products containing the active ingredients copper oxide, copper hydroxide, and cuprous thiocyanate. DPR initiated this reevaluation based on findings from a June 2009 DPR report titled, *Monitoring for Indicators of Antifouling Paint Pollution in California Marinas*. The report found that dissolved copper concentrations in more than half the water samples taken from salt and brackish water marinas exceeded the California Toxics Rule (CTR) chronic water quality standard, also a third of the samples exceeded the acute standard.

California Regional Water Quality Control Boards' (CRWQCBs') water quality criteria require that all waters be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Dissolved copper concentrations were determined to violate CRWQCBs' water quality objectives for toxicity. DPR's report found that copper-based AFP pesticides applied to boat hulls are likely a major source of dissolved copper in salt and brackish water marinas, particularly during dry weather periods. The report found that the main pathways of copper contamination appear to be passive leaching of antifouling-painted boat hulls and underwater boat hull cleaning.

Data Requirements: Under this reevaluation, DPR requires registrants of copper-based AFPs to submit the following: (1) information identifying the paint type (e.g., ablative, epoxy ester); (2) data characterizing the products' copper leach rate; (3) specific mitigation strategies that will reduce dissolved copper concentrations in California salt and brackish water marinas to levels below CTR or regionally applicable standards; and (4) marina monitoring data to determine compliance with CTR standards after mitigation strategies have been implemented. In March 2011, copper AFP registrants were notified of an additional data requirement intended to determine the impact of underwater hull cleaning activities on copper concentrations in California marinas. DPR will address specific mitigation strategies and marina monitoring after analysis and assessment of paint type, leach rate, underwater hull cleaning and all available information.

Summary: DPR has completed its evaluation of leach rate and paint type information for all copper AFP pesticide products. Based on the information received, most copper-based AFPs are either copolymer ablative or epoxy ester paint types. Copper leach rate and paint type provides DPR with important data and information to better assess factors that contribute to high dissolved copper concentration in marinas from AFP pesticides. In June 2012, DPR approved the American Coating Association-Antifouling Working Group's (ACA-AFWG) underwater hull cleaning study protocol. DPR asked that academia be involved in all aspects of this study and the findings be submitted to a peer-reviewed journal. In April 2013, ACA submitted a draft report of the results from the underwater hull cleaning study to DPR. On November 7, 2013, the final report entitled, "Life Cycle Contributions of Copper from Vessel Painting and Maintenance Activities" was published in *Biofouling: The Journal of Bioadhesion and Biofilm.* DPR has completed its evaluation of the study and is currently evaluating mitigation scenarios based on leach rate data and inverse modeling using the Marine Antifoulant Model to Predict Environmental Concentrations (MAM-PEC).

In February 2013, the California Legislature introduced Assembly Bill (AB) 425, which required DPR to determine a copper paint leach rate and make mitigation recommendations by February 1, 2014. On October 5, 2013, AB 425 was signed into law.

Mitigation Efforts and Status: DPR is currently in the process of developing a copper paint leach rate and mitigation recommendations based on reevaluation generated data and hull cleaning information to reduce dissolved copper concentrations in California marinas from copper-based AFP pesticides. For more information on this reevaluation please, visit the following Web page: <http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/antifoulant_paints.htm>.

BRODIFACOUM – 21 Products

Basis and Scope: On December 30, 1999, at the request of the Department of Fish and Wildlife (DFW) (formerly Department of Fish and Game), DPR placed pesticide products containing the active ingredient brodifacoum into reevaluation. DFW expressed concern that California's wildlife are exposed to, and may be adversely affected by, currently registered uses of brodifacoum. As a second-generation anticoagulant rodenticide, brodifacoum delivers a delayed lethal dose to the target rodent with the first feeding that does not kill the rodent immediately. After multiple feedings a rodent may have a significant "body burden" of this persistent pesticide at death and may lead to non-target wildlife exposures through contact with the carcass. Given the increased public interest in wildlife issues associated with brodifacoum, DPR began taking steps to address the problems associated with the use of brodifacoum and two other second-generation anticoagulants, bromadiolone and difethialone.

Based on available information and the data submitted by DFW, DPR completed and presented an issue paper recommending a number of mitigation measures in the fall of 2005. DPR proposed that rodenticide baits containing brodifacoum, bromadiolone, and difethialone be restricted to indoor structural use only. However, based on comments from representatives of the pest control industry expressing concern over the restriction, DPR reconsidered its proposal.

DPR instead decided to work with U.S. EPA on its rodenticide risk mitigation decision. In May 2008, U.S. Environmental Protection Agency (EPA) announced its final *Risk Mitigation Decision (RMD) for Ten Rodenticides* and enacted mitigation measures. The final RMD groups the ten rodenticides into first and second-generation anticoagulants, and non-anticoagulants. First-generation anticoagulants include chlorophacinone, diphacinone, and warfarin. Second-generation anticoagulants include brodifacoum, bromadiolone, difethialone, and difenacoum. Non-anticoagulants include zinc phosphide, bromethalin, and cholecalciferol. In the final RMD, U.S. EPA minimized children's exposure to rodenticide products used in homes by asking all first-generation and non-anticoagulant rodenticide products marketed to residential consumers be sold as solid formulations preloaded in bait stations. To reduce wildlife exposures and ecological risks, U.S. EPA restricted sale and distribution of second-generation anticoagulant products with the intention of minimizing availability to residential consumers. U.S. EPA also restricted all outdoor, aboveground use of second-generation anticoagulants to use in bait stations. U.S. EPA allowed continued sale of larger size quantities of second-generation rodenticides at farm type stores.

<u>*Summary:*</u> While most companies that produce rodenticide products agreed to adopt the new federal safety measures, three companies did not. As a result, on November 2, 2011, U.S. EPA issued a *Draft Notice of Intent to Cancel and Notice of Denial of Registrations of Certain Rodenticide Bait Products* that identified 20 federally registered products as subject to federal cancellation. Registrants of 8 of the 20 products withdrew their registrations in response to the notice. On February 5, 2013, U.S. EPA issued a final *Notice of Intent to Cancel* the registration of the 12 remaining non-compliant Reckitt Benckiser rodenticide products. In response, Reckitt Benckiser requested a hearing before an EPA Administrative Law Judge. Until the hearing is completed, the company may continue to market the 12 products. Four of the products are currently registered with DPR. DPR will continue to monitor U.S. EPA's action on this matter.

In the summer of 2011, DFW requested DPR designate second-generation anticoagulant rodenticides as California restricted materials. To support their request, DFW provided wildlife incident data in December 2011. DPR also sought out and received incident data from researchers and wildlife rehabilitation organizations. In September 2012, DPR completed a final draft of its *Second Generation Anticoagulant Rodenticides (SGAR) Assessment* memorandum based on available data and evaluation of the potential and actual risk to non-target wildlife from second-generation anticoagulant rodenticides. The document concluded that the use of second-generation anticoagulant rodenticides presents a hazard related to persistent residues in target animals resulting in impacts to non-target wildlife. The California Health and Safety Code section 57004(b), requires that prior to using any scientific document as the scientific basis for regulatory action (rulemaking), the scientific document must receive an external scientific peer review. In October 2012, DPR initiated the scientific peer review process, which was completed in February 2013. Additionally, upon completion of the external scientific peer review, the *SGAR Assessment* was made available to stakeholders for comment and DPR held several meetings with various stakeholders to discuss possible mitigation measures. On June 27, 2013, DPR responded to comments received by the external scientific peer reviewers and five independent/organizations, and finalized its *SGAR Assessment* memorandum.

On July 19, 2013, DPR made its proposal to designate second-generation anticoagulant rodenticides (brodifacoum, bromadiolone, difenacoum, difethialone) as California restricted materials, add additional use restrictions, and revise the definition of a private applicator available for public comment. The comment period closed on October 4, 2013 and DPR is in the process of reviewing and responding to the comments received.

Mitigation Efforts and Status: DPR considers the proposed action to designate SGARs as California restricted materials to be a significant mitigation measure. DPR is in the process of reviewing and responding to the comments received on the rulemaking proposal. After responding to the comments received, DPR anticipates sending it to the Office of Administrative Law (OAL) for their review. For more information on this reevaluation, please visit the following Web page:
<http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/brodifacoum.htm>.

CHLOROPICRIN – 34 Products

Basis and Scope: On October 16, 2001, DPR initiated the reevaluation of pesticide products containing the active ingredient chloropicrin based on data submitted under the Birth Defect Prevention Act (BDPA), which was found to have the potential to cause adverse health effects at low doses. The National Institute for Occupational Safety & Health (NIOSH) set an eight-hour time weighted average of 0.1 parts per million (ppm), primarily for the prevention of eye irritation in humans, as the reference exposure limit for workers exposed to chloropicrin.

Data Requirements: Under this reevaluation, DPR required chloropicrin registrants to conduct and submit the results of various worker exposure and air quality monitoring studies from field and greenhouse applications. DPR completed its review of the required monitoring data in August 2005 and as part of the reevaluation process to mitigate potential adverse effects at low concentrations, began work on a chloropicrin risk characterization document (RCD).

Summary: In February 2010, DPR completed a RCD for chloropicrin as a toxic air contaminant (TAC) and an assessment of risks associated with potential exposures to residents and bystanders from ambient and off-site air concentrations of agricultural use chloropicrin pesticide products. DPR found that the use of chloropicrin products for agricultural soil fumigation applications results in unacceptable acute, seasonal, and chronic exposures to residents and bystanders. A risk management directive (RMD) addressing resident and bystander exposures identified by the TAC evaluation was issued in December 2010. This RMD set a regulatory target of 73 ppb averaged over an eight-hour time period to restrict acute exposure.
Based on the RCD (as a TAC) and the recommendation of the Scientific Review Panel (SRP), DPR designated chloropicrin as a TAC effective January 8, 2011. DPR completed its comprehensive chloropicrin RCD (which includes dietary and occupational exposure scenarios) on November 14, 2012. For more information, see California Notice 2013-05.

DPR will issue an additional RMD to address any health concerns related to occupational, seasonal, and chronic exposures identified in the final comprehensive risk assessment, if necessary. When a final draft of the occupational, seasonal, and chronic RMD becomes available, a public notice with a link to this RMD will be issued and posted on DPR's Web site.

Mitigation Efforts and Status: In May 2013, DPR proposed mitigation measures designed to protect bystanders and residents from acute (short-term) exposures to chloropicrin and requested comments. DPR proposed additional restrictions beyond labeling and regulation to protect residents and bystanders including: buffer zones; buffer zone credits; acreage limits; time periods between applications with overlapping buffer zones; emergency preparedness and response; and notice of intent requirements. DPR has developed the proposed mitigation measures in consultation with the Air Resources Board, the air pollution control districts, and the County Agricultural Commissioners, as required by Food and Agricultural Code section 14024(a) to protect public health concerns for residents and bystanders. In August 2013, the comment period closed. DPR is in the process of reviewing and responding to the comments received. During this process, DPR determined an external peer review was needed regarding the proposed buffer zones and submitted it for external peer review in November 2013. The external peer review is anticipated to be completed in the first quarter of 2014. At this time, DPR will defer concluding the reevaluation until an occupational, seasonal, and chronic RMD is completed and, if necessary, additional mitigation measures are implemented. For more information on this reevaluation, please visit the following Web page: <http://www.cdpr.ca.gov/docs/registration/reevaluation/currentevals.htm>.

CHLORPYRIFOS – 32 Products

Basis and Scope: On March 11, 2004, DPR placed all agricultural use (including turf use) products containing chlorpyrifos into reevaluation based on monitoring data collected by the Central Valley Regional Water Quality Control Board (CVRWQCB). The monitoring data revealed that chlorpyrifos levels exceeded water quality criteria (WQC) for aquatic invertebrates in the rivers and tributaries of the San Joaquin (SJ) Valley, the Sacramento/ SJ Delta, and Monterey County. These detections of chlorpyrifos have resulted in the development of an organophosphate pesticide total maximum daily load (TMDL) in identified segments of the SJ River and Sacramento/ SJ Delta.

Data Requirements: Under this reevaluation, chlorpyrifos registrants are required to do the following: (1) identify the process by which chlorpyrifos pesticides are contributing to detections in surface water at levels that exceed WQC; and (2) identify mitigation strategies that have been shown to reduce or eliminate chlorpyrifos residues in surface water. In December 2004, DPR reviewed and agreed with the basic manufacturer's assessment of the modes of transport for chlorpyrifos residues to surface water and required them to submit specific mitigation strategies. The basic manufacturer responded with the submission of data and information, including mitigation measures intended to reduce chlorpyrifos residues in surface water when the products are used under California conditions. In January 2006, DPR determined that in order to assess the impact of the submitted mitigation measures, a protocol and final study report for

chlorpyrifos monitoring data were required of the basic manufacturer. In July 2006, DPR accepted the basic manufacturer's study proposal to collect and evaluate monitoring data over a number of years for better analysis on the effectiveness of the mitigation efforts.

Summary: In the spring of 2008 and 2009, the basic manufacturer submitted two separate final reports. In August 2010 DPR scientists determined the submitted data and field investigations show the following: (1) chlorpyrifos continues to be detected in surface water at levels that exceed water quality thresholds; (2) exceedances occur at multiple sites in the SJ, Santa Maria, and Salinas River watersheds; (3) multiple crops and agricultural practices potentially contribute to the off-site movement of chlorpyrifos; and (4) both applications made in accordance with, and in violation of, label requirements potentially contribute to off-site movement of chlorpyrifos. As a result, DPR requested additional monitoring data through 2010. In August 2011, the basic manufacturer submitted a report titled *Surface Water Monitoring Results and Historical Trend Analysis of Chlorpyrifos in Surface Water 2004-2010,* which DPR completed its review in March 2012. In April 2012, DPR completed an analysis memo titled, *Analysis of Chlorpyrifos Agricultural Use in Regions of Frequent Surface Water Detections in California, USA*.

Mitigation Efforts and Status: During the course of this reevaluation various mitigation measures have been implemented. On July 31, 2006, U.S. EPA finalized its Reregistration Eligibility Decision (RED) on chlorpyrifos requiring certain mitigation measures to reduce ecological and human health risk such as non-agricultural uses of chlorpyrifos (phased out during 2002-2004), buffer zones to protect water quality, and application rate reductions. Also in July 2006, DPR imposed dormant spray regulations to restrict pesticide application during the dormant season, which coincides with the rainy season in winter. This regulation implemented dormant season insecticide application restrictions such as property operator dependent specific requirements, written recommendation from a pest control adviser before application, and prohibition for certain described scenarios. At the same time, DPR began its Dormant Spray Water Quality Initiative focused on the prevention of aquatic toxicity from residues of chlorpyrifos and other dormant season pesticides in the Sacramento and San Joaquin Rivers. In July 2012, U.S. EPA announced additional spray drift mitigation measures to reduce application rates and mandated buffer zones that will be more protective. DPR continues to monitor U.S. EPA's efforts and is evaluating other possible mitigation strategies, including regionally specific measures in California's Central Coast counties and other counties. At this time, DPR is working with various state and local agencies in the Central Coast on possible mitigation measures. For more information on this reevaluation, please visit the following Web page: <http://www.cdpr.ca.gov/docs/registration/reevaluation/currentevals.htm>.

CYFLUTHRIN – 38 Products

Basis and Scope: On May 5, 1998, DPR placed pesticide products containing the active ingredient cyfluthrin into reevaluation. The reevaluation is based on DPR's investigations of a May 1997 outbreak of respiratory irritation reported among orange harvesters exposed to residues of cyfluthrin in Tulare County and other cyfluthrin related pesticide illness reports. As part of the investigation, DPR's Worker Health & Safety Branch conducted two separate

inhalation-monitoring studies in orange groves during orange harvest. DPR determined that as dust and pollen are a part of the normal working environment, something different in the work environment led to the workers' respiratory irritation symptoms experienced. DPR compiled the results in its monitoring study titled, *Health and Safety Report HS – 1765*, which found that it appears probable that cyfluthrin applied close to harvest led to the symptoms experienced.

Data Requirements: Under this reevaluation, registrants of pesticide products containing the active ingredient cyfluthrin were required to provide the following: (1) respiratory irritation study, (2) worker exposure study, and (3) monitoring data for structural application. In October 2001, the basic manufacturer submitted the following: two worker exposure studies regarding hand harvesting of oranges and sweet corn; four indoor exposures studies; and a study titled, *Study on the RD_{50} Determination in Rats*. Based on this data, DPR determined that no further structural monitoring data was required. However, during the course of this reevaluation, DPR determined it had insufficient data regarding worker exposure during the hand harvesting of sweet corn. As a result, in February 2002, DPR required a sweet corn worker exposure study. The results of the study were submitted to DPR in October 2004.

Relevant Activity: In 2006, DPR determined that a comprehensive exposure assessment is necessary for cyfluthrin as part of the reevaluation process. In September 2008, DPR completed an exposure-scoping document for cyfluthrin intended to lay the groundwork for the risk assessment process. This reevaluation is pending further evaluation and assessment of the potential risks associated with the use of cyfluthrin.

Mitigation Efforts and Status: At this time, the reevaluation of cyfluthrin is on hold pending completion of a final risk assessment on cyfluthrin. Additionally, DPR is working with U.S. EPA on the risk assessment. If DPR's risk assessment concludes that use of cyfluthrin poses a risk to workers, DPR will proceed with mitigation. For more information on this reevaluation, please visit the following Web page:
<http://www.cdpr.ca.gov/docs/registration/reevaluation/currentevals.htm>.

DIAZINON – 4 Products

Basis and Scope: On February 19, 2003, DPR initiated the reevaluation of agricultural use diazinon products labeled as dormant sprays based on monitoring studies conducted between 1991 and 2001 by the U.S. Geological Survey, Dow AgroSciences, CVRWQCB, State Water Resources Control Board (SWRCB), and DPR. These studies reported the presence of diazinon in surface waters of the Sacramento and San Joaquin Valleys at levels that exceed water quality criteria (WQC), especially during the dormant spray season.

Data Requirements: Under this reevaluation, diazinon registrants are required to do the following: (1) identify the processes by which diazinon dormant spray products are contributing to detections of diazinon in surface water at levels that exceed WQC; and (2) identify mitigation strategies that will reduce or eliminate diazinon residues in surface water. In June 2010, DPR expanded the reevaluation based on analysis of DPR monitoring data to include in-season uses as

well as dormant season applications and required the registrants to do the following: (1) collect and evaluate all relevant (2005-2009) surface water monitoring data to determine if application of diazinon to specific irrigated fields is resulting in exceedances of WQC; and, (2) establish crop-specific mitigation measures based upon results of submitted monitoring data. At initiation of this reevaluation, to address off-site movement of diazinon residues, the registrants responded by developing supplemental labeling for dormant spray products and agreed to conduct monitoring studies to assess the effectiveness of the proposed mitigation strategies during the dormant spray season.

Summary: In July 2005, DPR approved the submitted protocols intended to evaluate the effectiveness of the proposed mitigation strategies. In September 2006, the registrant submitted the final studies which were found to be conducted acceptably, but that did not provide information as to whether registrants intended to use the information to develop additional mitigation measures. Meanwhile, DPR began working on mitigation options at the beginning of the reevaluation and in July 2006 approved dormant spray regulations that placed further restrictions on the use of diazinon products such as those described in the chlorpyrifos reevaluation. By December 2006, all dormant spray diazinon product labels were amended to add supplemental labeling requiring restrictions or prohibitions such as, dormant applications on orchards to be restricted to ground application equipment only, and to prohibit application when soil moisture is at field capacity and/or when a storm event is likely.

While working with the registrant on the proposed mitigation strategies in February 2007, DPR received a report prepared by University of California, Davis (UCD) titled *Residues of the 2006 TMDL Monitoring of Pesticides in California's Central Valley Waterways, January – March 2006*. This study reported diazinon concentrations measured during the 2006 dormant spray season were still exceeding WQC. DPR forwarded the UCD study to the registrants and requested the development and implementation of further mitigation measures to reduce or eliminate diazinon residues in surface water. In February 2008, the basic manufacturer submitted two reports titled, *Analysis of Diazinon Environmental Monitoring Data from the Sacramento/ Feather River Watersheds: 2001-2007*, and *Project Report: Landguard OP-A as a Best Management Practice in Dormant Season Use, December 2007*. In October 2008, the basic manufacturer submitted another report titled, *Analysis of Diazinon Environmental Monitoring Data from the San Joaquin River Watershed: 2001 –2007*.

Analysis of DPR monitoring data from 2003-2008 revealed 637 diazinon detections out of 2,635 samples from water bodies located in the Central Valley, Central Coast, and Southeastern California. As a result, on June 22, 2010, the Director expanded the reevaluation to include in-season uses as well as dormant season applications and required additional data of the registrants in order to better assess surface water runoff and exceedances. In March 2011, the basic manufacturer submitted a combined monitoring report for both the required dormant season and in-season monitoring titled, *Summary of Diazinon Water Column Monitoring Data for Nine California Regions: 2005-2010*, which DPR found to be acceptable. In September 2011, DPR completed an analysis memo titled, *Analysis of Diazinon Agricultural Use in Regions of Frequent Surface Water Detections*.

Mitigation Efforts and Status: During the course of this reevaluation, various mitigation measures have been implemented. In 2004, U.S. EPA eliminated all sales of outdoor residential use diazinon products. In July 2006, U.S. EPA finalized its RED on diazinon requiring certain mitigation measures to reduce ecological and human health risk such as provisions to cancel certain agricultural crop uses and aerial applications; reduce the amount and frequency of use; and employ engineering controls and other protective measures. On July 18, 2006, DPR adopted dormant spray regulations that placed further restrictions on the use of diazinon products such as those described in the chlorpyrifos reevaluation. Additionally, through the Dormant Spray Water Quality Initiative, DPR continues to work to prevent aquatic toxicity from residues of diazinon in the Sacramento and San Joaquin Rivers. DPR continues to monitor U.S. EPA's efforts and is discussing possible mitigation strategies and the next steps of this reevaluation. For more information on this reevaluation, please visit the following Web page: <http://www.cdpr.ca.gov/docs/registration/reevaluation/currentevals.htm>.

NEONICOTINOIDS (NITROGUANIDINE INSECTICIDES) – 288 Products

Basis and Scope: On February 27, 2009, DPR placed certain pesticide products containing the active ingredients imidacloprid, clothianidin, dinotefuran, and thiamethoxam into reevaluation. These active ingredients are in the nitroguanidine insecticide class of neonicotinoids. This reevaluation is based on an adverse effects disclosure involving the active ingredient imidacloprid. DPR's evaluation of the adverse effects data noted two critical findings: (1) high levels of imidacloprid in leaves and blossoms of treated plants, and (2) increases in residue levels over time. Thiamethoxam, dinotefuran and clothianidin are in the same chemical family as imidacloprid, and have similar characteristics (e.g., soil mobility, half-lives, and toxicity to honeybees).

Data Requirements: Under this reevaluation, in September 2009, DPR notified registrants of neonicotinoid pesticide products containing imidacloprid, thiamethoxam, dinotefuran, and clothianidin of the following data requirements: (1) field-based residue analysis in pollen and nectar from specific agricultural orchard and row crops for each of the four active ingredients; and, (2) an LC_{50} study on honey bees starting at the larval stage through emergence. DPR's Pesticide Use Reporting (PUR) database was used to determine the crops of focus for the data requirements. During the course of this reevaluation, issues arose from the field-based residue analysis on specific crop studies that required DPR to revise the data requirement. In 2012, new two-year prescriptive residue monitoring studies to examine "worst-case" scenarios rather than typical scenarios were added to the data requirements.

Summary (by Active Ingredient):

Imidacloprid: In 2009, the registrant submitted information and existing data to address DPR's reevaluation data requirements for field data on almonds, citrus, cotton, cucurbits (melons), fruiting vegetables (tomatoes), pome fruit, and strawberries. Rather than conducting a monitoring study in almonds, imidacloprid registrants chose instead to remove use on almonds from their

labels. In April 2010, the registrant submitted draft study protocols for monitoring studies in cotton, melons, tomatoes, pome fruit, and strawberries. The draft protocols were reviewed by DPR, U.S. EPA, and Pest Management Regulatory Agency (PMRA) Health Canada. In May of 2011, DPR received final reports from monitoring studies conducted in citrus (light and medium soil), cotton, and tomato. In March 2012, DPR provided a review of the submitted reports and found both the cotton and tomato studies to be unacceptable because they did not represent a worst-case scenario. As a result, DPR required new two-year prescriptive residue monitoring studies, representing a worst-case scenario, for fruiting vegetables, cotton and newly added crop group stone fruit. On March 21, 2012, DPR received a final study for acute toxicity effects in honeybee larva that is under review. In April 2012, the registrant submitted a final report on citrus titled, *Summary of key findings and conclusions of investigations to evaluate bee exposure levels at Southern California citrus groves previously treated with imidacloprid.* In May 2012, DPR reviewed and accepted four two-year prescriptive residue study protocols for cotton, tomato, cherry, and apple. On December 28, 2012, DPR received strawberry and cucurbit final reports that are under review.

Thiamethoxam: DPR requested field data on cucurbits, fruiting vegetables, pome fruit, and strawberries of thiamethoxam registrants. Draft protocols for residue monitoring studies in cucurbits (melons), fruiting vegetables (tomatoes), and pome fruit were received and reviewed by DPR, U.S. EPA, and PMRA. In March 2011, the registrant requested a waiver from the requirement to monitor pome and strawberries due to the limited field applications of thiamethoxam in 2009 and 2010. In January 2012, the basic manufacturer submitted final reports for tomatoes and acute toxicity to larval honeybees that are under review. On October 8, 2012, DPR notified the basic manufacturer that two-year prescriptive residue studies are required for almond, citrus, cotton, stone fruit, and strawberry, and granted a waiver for residue monitoring study on pome. On January 23, 2013, DPR received a final report on cucurbits, and protocols on citrus, cotton, and stone fruits that are all under review.

Dinotefuran: In November 2009, the dinotefuran registrant submitted information about the environmental fate and behavior of their products as well as existing data they felt satisfied the reevaluation data requirements in lieu of the requested study protocols. In March 2011, the registrant submitted a final report investigating foraging honeybees and hives after exposure to dinotefuran applied to cotton. In March 2012, the basic manufacturer submitted additional cotton field data and acute toxicity to larval honeybee data that are under review.

Clothianidin: In 2009, the clothianidin registrant documented limited use in California and its inability to perform the monitoring field studies requested under the reevaluation. Instead, the registrant proposed to conduct small-scale studies, analogues to magnitude-of- residues studies, on cucurbit. In January and April 2011, the registrant submitted an acute larval toxicity study protocol, and a draft protocol for conducting pollen and nectar residue sampling in cucurbits. In February 2012, the registrant submitted an acute toxicity to larval honeybees that is under review. In May 2012, the registrant submitted a more robust protocol on cucurbits (pumpkins) that is underway. On May 9, 2013, DPR notified the basic manufacturer that two-year prescriptive residue studies are required for almond, fruiting vegetable, and a stone fruit. In May

2013, DPR received an interim report on the cucurbit study that is currently under review. In August 2013, the registrant submitted a combined tree protocol (almond, apple, and peach) to address U.S. EPA, PMRA Health Canada and DPR's reevaluation. DPR anticipates receiving a final tree protocol in the first quarter of 2014. DPR anticipates a final report on cucurbits in the fourth quarter of 2014.

Mitigation Efforts and Status: During the course of this reevaluation, in April 2010 imidacloprid registrants agreed to remove use on almonds from all product labels in California. In December 2012, the thiamethoxam registrant agreed to remove use on almonds from all product labels in California. DPR considers these an important mitigation step in pollinator protection since almond orchards require a large number of pollinators.

DPR continues to work with U.S. EPA and PMRA on possible new data requirements and possible mitigation strategies. On August 15, 2013, U.S. EPA notified registrants of neonicotinoids of new labeling required for all formulations that have outdoor foliar use directions (except granulars) for the 2014 agricultural use season in order to improve bee protection. In November 2013, DPR required that registrants submit amended labels to California shortly after U.S. EPA acceptance. Additionally, DPR is in the process of actively analyzing crop residue and toxicity data, and investigating possible honeybee chronic effects studies that would be scientifically meaningful to the reevaluation. For more information on this reevaluation, please visit the following Web page: <http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/neonicotinoids.htm>.

PYRETHROIDS – 652 Products

Basis and Scope: On August 31, 2006, DPR placed certain pesticide products containing certain pyrethroids into reevaluation. The reevaluation is based on monitoring surveys and toxicity studies revealing the widespread presence of synthetic pyrethroid residues in the sediment of California waterways dominated by both agricultural and urban runoff at levels toxic to *Hyalella azteca (H. azteca).* Scientist commonly use *H. azteca*, an aquatic crustacean found in some Central Valley water bodies, as an indicator of environmental health and water quality in streams, lakes, and other water bodies. Significant toxicity was observed at numerous sites and there was a high correlation between concentrations of pyrethroids and observed toxicity. Findings further indicate that the unique physical, chemical, and toxicological properties of the pyrethroid class of chemicals contribute to their propensity to accumulate in sediment at toxic levels.

Pyrethroids are a synthetic class of insecticides. DPR did not include pesticide products containing pyrethrins, a naturally occurring insecticide found in *Chrysanthemum cinerariaefolium*, in this reevaluation because pyrethrins are known to breakdown rapidly in the environment. Also, DPR excluded certain product types, such as pressurized liquids and impregnated materials, from this reevaluation that were determined to be unlikely to move into surface waters or sediments.

Data Requirements: Under this reevaluation, and for purposes of data requirements, DPR divided pyrethroid chemicals into three groups. The first group (Group I) consists of the first generation or "Type I" photosensitive pyrethroids. Typically, these pyrethroids are used indoors and around residential areas. The second (Group II) and third groups (Group III) consist of the newer second-generation pyrethroids, most of which are "Type II" pyrethroids. The more toxic Group II and Group III pyrethroids are less photosensitive and persist longer in the environment. The two active ingredients identified as belonging in Group II have not been detected (or monitored for) in California aquatic sediments. Group III pyrethroids have been detected in aquatic sediments, and both Group II and III pyrethroids are widely used in both agricultural and urban settings.

Pursuant to this reevaluation, registrants with products containing active ingredients in Group I were required to submit certain environmental fate data. Registrants with products in Group II were required to submit sediment persistence and ecotoxicology data, and monitoring in areas appropriate to use patterns. Registrants with products in Group III were required to submit the following: (1) certain environmental fate data, (2) sediment persistence and ecotoxicology data, and (3) transport mechanisms and mitigation data. In addition, registrants with products containing Group III pyrethroids were required to conduct monitoring in Publicly Owned Treatment Work (POTW) facilities.

Summary (by Group and Data Type):

Group I Active Ingredients

The active ingredients that fall into this group are bioallethrin, d-allethrin, imiprothrin, phenothrin, prallethrin, resmethrin, and tetramethrin. Typically, these pyrethroids are used indoors and around residential areas. DPR has completed its review of the environmental fate data requested for Group I pyrethroids. DPR determined that no further data are necessary for these active ingredients at this time.

Group II Active Ingredients

The active ingredients that fall into this group are tau-fluvalinate and tralomethrin. Based on a commitment by registrants of Group II products to implement the same mitigation measures developed for Group III products with similar use, DPR determined nothing further is required of this group at this time.

Group III Active Ingredients

The active ingredients that fall into this group are beta-cyfluthrin, bifenthrin, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, fenpropathrin, gamma-cyhalothrin, lambda-cyhalothrin, permethrin, and (S)-cypermethrin.

> *Part 1 – Environmental Fate Data*
>
> DPR has completed its review of the environmental fate data requested for Group III pyrethroids and will use these data in its characterization of pyrethroids for this reevaluation.

Part 2 – Sediment Persistence and Ecotoxicology Data
In June 2007, DPR found the sediment analytical method studies submitted by the Pyrethroid Working Group (PWG) to be adequate to satisfy the DPR's analytical method data requirement for all Group III pyrethroids in sediment. In the second quarter of 2010, PWG submitted a revised 10-day acute sediment toxicity tests with *H. azteca* and *Chironomus dilutus (C. spp),* and cold temperature studies were reviewed and found to be acceptable. DPR deferred the 42-day *H. azteca* chronic studies until U.S. EPA's Office of Chemical Safety and Pollution Prevention finalizes the 850 series test guidelines addressing whole sediment life cycle toxicity tests for *H. azteca* and *C. spp.* In June 2012, PWG submitted a final aerobic/anaerobic aquatic sediment half-life study that was reviewed and found to be acceptable.

Part 3 – Transport Mechanisms and Mitigation
Development of Monitoring Plans in Areas Appropriate to Use Pattern – In July 2007, PWG submitted an overall plan to address transport mechanisms and mitigation in agricultural and urban settings, and explained how the study proposals address off-site movement of pyrethroid residues.

In January and April 2009, PWG submitted final reports from their investigation of building materials and turf. The objectives of these studies were to (1) identify the most important aboveground building material scenarios for potential future best management practices (BMP) studies, and (2) compare runoff losses from grass irrigated under BMP to reduce runoff losses from excessive lawn irrigation. The studies indicated that impervious (non-porous) surfaces are a large factor to pyrethroid runoff.

Identification of Off-site Movement – In November 2009, DPR required Group III pyrethroid registrants to develop an urban pathway conceptual model and conduct a survey of pest control businesses. In December 2010, PWG submitted a final report titled, *California 2009 Urban Pesticide Use Pattern Study*. DPR's review of the submitted study found several conclusions of interest that could contribute to mitigation measures targeting outdoor perimeter treatment. In September 2010, PWG submitted a protocol titled, *Pathway ID Study Protocol*, which received feedback from DPR and stakeholders. On June 15, 2011, PWG submitted a revised protocol titled, *Pathway ID Study Protocol* that was approved by DPR. This study examines six pyrethroids found in eight end-use products, under various urban residential runoff event scenarios in order to assess off-site movement from impervious and pervious surfaces, and the impact of revised label mitigation measures restricting applications. In late May of 2012, DPR received an interim report on the *Pathway ID Study*. On May 30, 2013, DPR received the Pathway ID final report that has been reviewed. The study found that with historical application practices, the driveway was the largest contributor of pyrethroids, while the garage door and adjacent walls were the primary contributors when revised application practices were used. Furthermore, revised application practices were found to significantly reduce the amount of pyrethroids in the runoff. A formulation-focused study is in progress which DPR anticipates a final report on in the second quarter of 2014.

Part 4 – Monitoring in Publicly Owned Treatment Works (POTWs)
In March 2007, PWG submitted a proposal to address the fate and extent of permethrin (pyrethroids) in POTWs. DPR sent the proposal to key stakeholders for comment. In April 2007, DPR received comments on the proposal from Tri-TAC, a technical advisory committee for California POTWs. To develop a study protocol and exchange information, PWG established a small working group with DPR staff and members of Tri-TAC. In November 2008, PWG provided DPR with a preliminary study design for POTW monitoring. In July 2009, DPR coordinated review of PWG's preliminary study design with Tri-TAC. In October 2009, Tri-TAC provided comments supporting DPR in requesting a final POTW monitoring study protocol from PWG. In January 2011, PWG submitted a draft protocol and analytical methods for monitoring eight Group III pyrethroids. On July 15, 2011 DPR notified registrants of products containing the active ingredients beta-cyfluthrin, bifenthrin, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, fenpropathrin, gamma-cyhalothrin, lambda-cyhalothrin, permethrin, and (S)-cypermethrin of the POTW monitoring data requirements. In December 2012, PWG provided an updated project timeline. On January 17, 2013, PWG submitted a final protocol to DPR that was found to be acceptable. On October 30, 2013, PWG submitted the POTW monitoring study final report that is currently being reviewed. DPR also anticipates the submission of the independent laboratory validation in support of this study by PWG in April 2014.

Mitigation Efforts and Status: On June 4, 2009, U.S. EPA notified registrants of label changes to address environmental hazards and general labeling for pyrethroid non-agricultural outdoor products. DPR will continue to monitor U.S. EPA's efforts with this chemical class.

During the course of this reevaluation, in July 2012, DPR implemented regulations identifying seventeen pyrethroids as having a high potential to contaminate surface water in outdoor non-agricultural settings. DPR requires pest control businesses, including maintenance gardeners, which apply these pesticides to take certain actions to minimize off-site movement from hard non-porous surfaces. This is considered an important mitigation measure for urban-outdoor residential use of pyrethroids. Additionally, data and information from the pest control business survey (a large segment of pyrethroid use) and the pathway identification study indicate that the DPR regulations along with the other mitigation measures mentioned are significant steps in the reduction of pyrethroid runoff in urban residential environments. DPR is currently evaluating the focus and status of this reevaluation and is examining other relevant pyrethroid use-site specific issues. For more information on this reevaluation, please visit the following Web site: <http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/pyrethroids.htm>.

II. PRELIMINARY INVESTIGATIONS (EVALUATIONS)

DPR conducts preliminary investigations of products (and active ingredients) for which DPR or other State or county agencies have identified possible hazards. As a result of evaluation, the investigation may lead to formal reevaluation. No preliminary investigations have been initiated at this time.

DPR is aware there are questions regarding the reevaluation process and as a result is actively working on ways to improve and communicate each reevaluation, the reevaluation process, and the reevaluation program.

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Original signed by ***April 18, 2014***

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