Department of Pesticide Regulation

Brian R. Leahy
Director

Edmund G. Brown Jr.
Governor

California Notice 2015-04

SEMIANNUAL REPORT SUMMARIZING THE REEVALUATION STATUS OF PESTICIDE PRODUCTS DURING THE PERIOD OF July 1, 2014 THROUGH December 31, 2014

California regulations require that the Department of Pesticide Regulation (DPR) 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 issues that may concern other state or federal agencies.

When a pesticide enters the reevaluation process, DPR reviews existing data and may require that registrants provide additional data to characterize the nature and extent of the potential hazard, and 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.

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)*--started when DPR receives possible adverse impact data or information resulting from the use of a product and/or active ingredient, but no formal reevaluation has been initiated (page 14).

I. FORMAL REEVALUATION

Formal reevaluation is initiated when an investigation indicates a significant adverse impact has occurred or is likely to occur. Each reevaluation is summarized with regard to the following four areas: (1) *Basis and Scope*, (2) *Data Requirements* (if any), (3) *Summary* (e.g., protocol development, study/data submission and evaluation, new product roll-in, DPR analysis papers, risk assessments), and (4) *Mitigation Efforts and Status*.

ANTIFOULING PAINT PESTICIDES (COPPER) – 191 Products

Basis and Scope: On June 1, 2010, DPR placed antifouling paint (AFP) pesticide products containing the active ingredients copper oxide, copper hydroxide, and cuprous thiocyanate into reevaluation. DPR initiated this reevaluation based on findings from a June 2009 DPR report entitled, *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 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 violate CRWQCBs' water quality objectives for toxicity. DPR's report found that copper 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 concluded that the main pathways of copper contamination appear to be passive leaching and in-water boat hull cleaning of copper antifouling-painted boats.

Data Requirements: Under this reevaluation, DPR requires registrants of copper AFPs to submit the following: (1) information identifying the paint type (e.g., ablative, epoxy ester); (2) data characterizing the product's copper leach rate; (3) specific mitigation strategies that reduce dissolved copper concentrations in California salt and brackish water marinas; and (4) marina monitoring data after mitigation strategies have been implemented. In March 2011, copper AFP registrants were notified of an additional data requirement to examine the impact of in-water hull cleaning activities on copper concentrations in California marinas.

Summary: DPR has completed its evaluation of leach rate and paint type information for all copper AFP pesticide products. Based on submitted paint type information, most copper AFPs are either copolymer ablative or epoxy ester. 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 Groups' in-water hull cleaning study protocol. DPR asked that academia be involved in all aspects of this study, and that the findings be submitted to a peer-reviewed journal. 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 completed its evaluation of the study and made mitigation determinations and recommendations based on the hull cleaning study and all available information. DPR utilized the Marine Antifoulant Model to Predict Environmental Concentrations as a reliable modeling tool to simulate the fate of copper in typical California marinas.

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

On January 30, 2014, DPR established two maximum leach rates depending on cleaning practice. The leach rates are 9.5 µg/cm^2/day if cleaning is limited to no more than once per month and follow best management practices using soft-pile carpet, and 13.4 µg/cm^2/day for products that prohibit in-water hull cleaning. In addition, DPR recommended seven mitigation measures.

DPR has presented the maximum allowable leach rates and mitigation recommendations to registrants, stakeholders, and sister agencies at several meetings. During this report period, DPR met with registrants and various stakeholders to discuss aspects of the reevaluation and AB 425 including reformulation, leach rate categorization, possible label changes, and outreach materials. Currently, DPR is in the process of finalizing specific data requirements and implementing mitigation actions to reduce copper concentrations in California marinas. Additionally, DPR will continue to monitor the State Water Resources Control Boards' (SWRCBs') copper mitigation activities.

For more information on this reevaluation, please visit:
<http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/antifoulant_paints.htm>.

BRODIFACOUM (Second Generation Anticoagulant Rodenticide) – 22 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 (SGAR), brodifacoum delivers a delayed lethal dose to the target rodent with the first feeding, which 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 dead or dying rodents. 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.

In the fall of 2005, based on available information and the data submitted by DFW, DPR completed and presented an issue paper recommending a number of mitigation measures. 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 (RMD). In May 2008, U.S. Environmental Protection Agency (U.S. EPA) announced its final *Risk Mitigation Decision 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 requiring all first generation and non-anticoagulant rodenticide products marketed to residential consumers to be sold as solid formulations preloaded in bait stations. To reduce wildlife exposures and ecological risks, U.S. EPA restricted the sale and distribution of second generation anticoagulant products to farm stores in order to minimize availability to residential consumers. Additionally, U.S. EPA restricted all outdoor aboveground uses of second generation anticoagulants to bait stations. However, U.S. EPA allowed continued sale of larger size quantities of second generation rodenticides at farm type stores.

Summary: 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 to DPR in December 2011. Additionally, DPR sought out and received incident data from researchers and wildlife rehabilitation organizations. In September 2012, based on available data and evaluation of the potential and actual risk to non-target wildlife from SGARs, DPR completed a final draft of its *Second Generation Anticoagulant Rodenticides Assessment* memorandum. The document concluded that the current uses of SGARs presents a hazard related to persistent residues in target animals resulting in adverse impacts to non-target wildlife.

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. 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 mitigation measures. On June 27, 2013, after revising the assessment in response to external scientific peer review comments, DPR finalized its *SGAR Assessment* memorandum.

Mitigation Efforts and Status: During this reevaluation, while most companies that produce rodenticide products agreed to adopt the 2008 federal safety measures, three companies did not. 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* identifying 20 federally registered products as subject to federal cancellation. As a result, registrants of 8 of the 20 products withdrew their registrations. 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 U.S. EPA Administrative Law Judge. On May 30, 2014, U.S. EPA and Reckitt Benckiser reached an agreement to cancel the 12 d-CON products and stop production by the end of 2014, and distribution by March 31, 2015.

On July 19, 2013, DPR made its proposal to designate second generation anticoagulant rodenticides (brodifacoum, bromadiolone, difenacoum, and difethialone) as California restricted materials, add additional use restrictions, and revise the definition of a private applicator. The proposed regulation was made available for public comment. DPR responded to the comments received, and on February 6, 2014, submitted the final rulemaking file to the Office of Administrative Law (OAL).

On March 18, 2014, the OAL approved the proposed regulations amending 3 CCR section 6000 and 6400, and adopting section 6471. On July 1, 2014, the regulations went into effect and SGARs can now only be sold by licensed dealers and purchased by certified applicators. Restricting the sale of SGARs to certified applicators is expected to significantly mitigate exposure to, and protect, California's non-target wildlife. On July 18, 2014, DPR concluded the brodifacoum reevaluation and determined no additional mitigation measures to be necessary.

For more information on this reevaluation, please visit:
<http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/brodifacoum.htm>.

CHLOROPICRIN – 36 Products

Basis and Scope: On October 16, 2001, DPR placed pesticide products containing the active ingredient chloropicrin into reevaluation. The reevaluation is based on air monitoring data which found that air concentrations at some distances from treated greenhouses exceeded National Institute for Occupational Safety & Health's reference exposure limit of 100 parts per billion (ppb) averaged over an eight-hour period. Also, DPR found that data submitted under the Birth Defect Prevention Act indicated that chloropicrin has the potential to cause adverse health effects at low doses.

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

Summary: In February 2010, DPR completed a risk assessment document for chloropicrin as a toxic air contaminant (TAC) that analyzed the risks associated with potential exposures to residents and bystanders from ambient and off-site air concentrations of agricultural use chloropicrin products. Peer review of this document by the Scientific Review Panel was completed in April 2010 and a regulation listing chloropicrin as a TAC was filed on December 9, 2010. Also in December 2010, based on the TAC risk assessment, DPR issued a risk management directive (RMD) to address resident and bystander exposures identified by the TAC evaluation. This RMD determined that the appropriate regulatory target level to restrict acute exposure to chloropicrin is 73 ppb averaged over an eight-hour period. After chloropicrin was designated as a TAC effective January 8, 2011, DPR staff initiated development of use restrictions following TAC procedures specified in state law. On November 14, 2012, DPR completed its comprehensive chloropicrin risk characterization document, which includes dietary and occupational exposure scenarios. For more information, see California Notice 2013-05.

Mitigation Efforts and Status: During the course of this reevaluation, U.S. EPA developed label mitigation measures under its Reregistration Eligibility Decision (RED) for products containing chloropicrin. These soil fumigant label measures require users to prepare site-specific Fumigant Management Plans and are intended to mitigate unacceptable exposures to workers, residents, and bystanders. The measures were implemented in two phases and went into effect on December 31, 2010, and December 1, 2012, and added more restrictions, prohibitions, and human health protection language and information. DPR has reviewed all the updated product labels, which are acceptable.

In May 2013, DPR proposed mitigation measures designed to protect bystanders and residents from acute (short-term) exposures to chloropicrin for public comment. These mitigation measures were developed using U.S. EPA's label changes as the foundation for mitigating off-site exposures. DPR proposed additional restrictions beyond labeling and regulation to protect residents and bystanders including: additional buffer zones; restriction on buffer zone credits; acreage limits; time periods between applications with overlapping buffer zones; emergency preparedness and response; and notice of intent requirements. DPR 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 addition to consulting with state and local agencies required by law, DPR also discussed early mitigation concepts with worker advocate groups and registrants. DPR also submitted its initial technical analysis for scientific peer review. DPR received comments from several thousand people and three peer reviewers. Also, DPR is considering an additional data requirement.

DPR is finalizing its mitigation measures, and the mitigation documents will be posted in January 2015, on DPR's Web site at <http://www.cdpr.ca.gov/docs/whs/chloropicrin.htm>.

For more information on this reevaluation, please visit:
<http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/chloropicrin.htm>.

CHLORPYRIFOS – 34 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 in certain segments of the SJ River and Sacramento/ SJ Delta.

Data Requirements: Under this reevaluation, DPR required chlorpyrifos registrants 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. In January 2006, DPR required the basic manufacturer to submit a chlorpyrifos monitoring protocol and final study report to assess the impact of the submitted mitigation measures. 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 entitled *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 on agricultural uses of chlorpyrifos entitled, *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 RED on chlorpyrifos requiring certain mitigation measures to reduce human health and ecological risk such as eliminating residential uses of chlorpyrifos (phased out during 2002-2004), increasing buffer zones to protect water quality, and application rate reductions.

In July 2006, DPR approved dormant spray regulations to restrict pesticide application during the dormant season (i.e. rainy season in winter). This regulation requires the operator of the property to follow certain practices, prohibits certain applications, and requires written recommendation from a pest control adviser before an application. Also in 2006, 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 SJ Rivers. U.S. EPA initiated registration review of chlorpyrifos in July 2011. In July 2012, U.S. EPA announced additional spray drift mitigation measures to reduce application rates and mandated more protective buffer zones. In December 2014, U.S. EPA released a revised human health risk assessment. DPR will continue to monitor U.S. EPA's efforts and is discussing mitigation measures to reduce human health and water quality concerns.

On August 15, 2014, DPR presented an update on chlorpyrifos at the Pesticide Registration and Evaluation Committee. On September 26, 2014, DPR submitted to the OAL a proposal to amend section 6400(e) of Title 3, California Code of Regulations, and opened the 45-day public comment period. The proposed action would designate the active ingredient chlorpyrifos as a state-restricted material when labeled for the production of an agricultural commodity. DPR is in the process of responding to the comments received, and anticipates the regulations to be in effect by the third quarter of 2015.

For more information on this reevaluation, please visit:
<http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/chlorpyrifos.htm>.

CYFLUTHRIN – 33 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 respiratory irritation outbreak reported among orange harvesters exposed to residues of cyfluthrin 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 entitled, *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 entitled, *Study on the RD_{50} Determination in Rats*. Based on this data, DPR determined the structural monitoring data was no longer 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 worker exposure study during sweet corn harvesting be conducted. The results of the study were submitted to DPR in October 2004.

Summary: 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. DPR has completed its review of the submitted studies and a final report is pending. 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 further evaluation and completion of a risk assessment of the potential risks associated with the use of 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:
<http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/cyfluthrin.htm>.

DIAZINON – 4 Products

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

Data Requirements: Under this reevaluation, DPR required diazinon registrants 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, based on analysis of monitoring data, DPR expanded the reevaluation to include in-season uses as well as dormant season applications of diazinon and required the registrants to do the following: (1) collect and evaluate all relevant (2005-2009) surface water monitoring data; and, (2) establish crop-specific mitigation measures based upon results of submitted monitoring data. The basic manufacturer agreed to conduct monitoring studies to assess the effectiveness of their proposed mitigation strategies during the dormant spray season. Also, at initiation of this reevaluation, registrants responded to DPR's concerns by developing and implementing supplemental labeling for dormant spray products.

Summary: In July 2005, DPR approved the basic manufacturer's submitted protocols intended to evaluate the effectiveness of the proposed mitigation strategies. In September 2006, the final studies were submitted, but were found to not provide information as to whether registrants

intended to use the information to develop and implement additional mitigation measures. Meanwhile, DPR began working on possible mitigation measures and in July 2006 approved dormant spray regulations. These regulations 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. The supplemental labels added more ecologically protective language such as prohibiting application when soil moisture is at field capacity and/or when a storm event is likely, and restricting dormant applications on orchards to ground application equipment only.

In February 2007, DPR received a report prepared by University of California, Davis (UCD) entitled, *Residues of the 2006 TMDL Monitoring of Pesticides in California's Central Valley Waterways, January – March 2006*. This study found that 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 entitled, *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*.

In October 2009, DPR analysis of monitoring data from 2003-2008 found that diazinon was detected in 637 out of 2,635 samples collected 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 dormant and in-season monitoring entitled, *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 entitled, *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 human health and ecological 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 SJ Rivers. DPR will continue to monitor U.S. EPA's efforts and is assessing the next steps of this reevaluation.

For more information on this reevaluation, please visit:
<http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/diazinon.htm>.

NEONICOTINOIDS (NITROGUANIDINE INSECTICIDES) – 274 Products

Basis and Scope: On February 27, 2009, DPR placed certain pesticide products containing the active ingredients imidacloprid, thiamethoxam, clothianidin, and dinotefuran into reevaluation. 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, known as nitroguanidine insecticide class of neonicotinoids, and have similar properties and characteristics (e.g., soil mobility, half-lives, and toxicity to honey bees).

Data Requirements: Under this reevaluation, DPR requires registrants of neonicotinoid pesticide products containing imidacloprid, thiamethoxam, clothianidin, and dinotefuran to provide the following data: (1) field-based residue studies in pollen, nectar, and leaves from specific agricultural orchard and row crops for each of the four active ingredients; and, (2) LC_{50} studies on honey bees starting at the larval stage through emergence. For data requirement purposes, DPR's Pesticide Use Reporting database was used to determine the crops of focus for each active ingredient. During this reevaluation, additional data were requested of imidacloprid registrants as the data provided were found to be inconclusive. The initial study strategy did not involve "worst-case" scenarios. DPR modified its residue study strategy to require controlled applications at the highest maximum application rate per year for two consecutive years. In October 2012, additional data were required of the thiamethoxam registrants, using the modified residue strategy, on strawberry, stone fruit, cotton, and citrus. In May 2013, additional data were required of clothianidin registrants, using the modified residue strategy, on almonds, cucurbits, stone fruits, and fruiting vegetables.

Summary (by Active Ingredient):
Imidacloprid: On September 15, 2009, DPR notified the registrants of products containing imidacloprid of the field residue data requirement on the following seven commodities: almonds, citrus, cotton, cucurbits (melons), fruiting vegetables (tomatoes), pome fruit, and strawberries. In response, the basic manufacturer submitted information and existing data. 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 and cotton, and expanded the crops required to include stone fruit (for a total of 8 crops required). On March 21, 2012, DPR received a final report examining acute toxicity effects in honey bee larva. In April 2012, the basic manufacturer submitted a final report on citrus entitled, *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, stone fruit (cherry), and pome fruit (apple). On December 28, 2012, DPR received strawberry and cucurbit final reports that are under review. On June 3, 2014, DPR received revised interim reports on cotton and tomato that are pending review. DPR anticipates a final report on cotton in the third quarter of 2015, and a final report on tomato in the first quarter of 2016. On November 20, 2014, DPR received interim reports on apple and cherry. DPR anticipates the final reports in the first quarter of 2016.

Thiamethoxam: On September 15, 2009, DPR notified the registrants of products containing thiamethoxam of the field residue data requirement on the following four commodities: cucurbits, fruiting vegetables, pome fruit, and strawberries. In response, the basic manufacturer submitted draft protocols for residue monitoring studies in cucurbits (melons), fruiting vegetables (tomatoes), and pome fruit, which were reviewed by DPR, U.S. EPA, and PMRA. In March 2011, the basic manufacturer requested a waiver from the requirement to monitor pome and strawberries due to limited California field applications of thiamethoxam in 2009 and 2010. In January 2012, the basic manufacturer submitted final reports for tomatoes and acute toxicity effects to larval honey bees. In October 2012, DPR notified the basic manufacturer of new two-year prescriptive residue studies for strawberry, and expanded the required crops to include almond, citrus, cotton, and stone fruit. DPR granted a waiver for residue monitoring study on pome (for a total of 7 crops required). On January 23, 2013, DPR received a final report on cucurbits, and final protocols on citrus, cotton, and stone fruits. In February 2013, rather than conducting a residue study in almonds, thiamethoxam registrants also removed its use from their labels. In September 2014, DPR received interim reports on citrus and cotton. Interim reports on stone fruit and strawberry are anticipated in the first quarter of 2015. DPR anticipates final reports on cotton and stone fruits in the third and fourth quarters of 2015, and final reports on citrus and strawberry in the first and second quarters of 2016.

Clothianidin: On September 15, 2009, DPR notified the registrants of products containing clothianidin of the field residue data requirement on pome fruit. In November 2009, the clothianidin basic manufacturer submitted data and information documenting limited use in California and its inability to perform the monitoring field study required under the reevaluation. Instead, the basic manufacturer proposed to conduct small-scale studies, analogues to magnitude-of-residue studies, on cucurbit. In January and April 2011, the basic manufacturer submitted an acute larval toxicity study protocol, and a draft protocol for conducting pollen and nectar residue sampling in cucurbits. In February 2012, the basic manufacturer submitted an acute toxicity effects to larval honey bees final report. In May 2012, the basic manufacturer submitted a more robust protocol on cucurbits (pumpkins). On May 9, 2013, DPR notified the basic manufacturer that two-year prescriptive residue studies are also required for almond, fruiting vegetable, and a stone fruit (for a total of 5 crops required). In May 2013, DPR received an interim report on the

cucurbit study that is currently under review. In August 2013, the basic manufacturer submitted a combined tree protocol (almond, pome, and stone fruit) to address U.S. EPA, PMRA Health Canada and DPR's reevaluation. DPR received the tree protocol in February 2014 and the study is in progress. On March 4, 2014, DPR received a year two interim report on cucurbits. DPR anticipates a final report on cucurbits by the second quarter of 2015. Interim reports on almonds, pome fruit, and stone fruits are anticipated in the second and third quarters of 2015.

Dinotefuran: On September 15, 2009, DPR notified the registrants of products containing dinotefuran of the field residue data requirement on the following three commodities: cotton, cucurbits, and fruiting vegetables. In November 2009, the dinotefuran basic manufacturer submitted data and additional information on the environmental fate and behavior of their products. In March 2011, the basic manufacturer submitted a final report investigating foraging honey bees and hives after exposure to dinotefuran applied to cotton. In March 2012, the basic manufacturer submitted additional cotton field data and acute toxicity effects to larval honey bee data.

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

During the course of this reevaluation, on August 15, 2013, U.S. EPA notified registrants of neonicotinoids of new labeling requirements for all formulations having outdoor foliar use directions (except granulars). Registrants are required to include prescribed bee protective language on their product labels for the 2014 agricultural use season for any existing or new product registrations. In November 2013, DPR required registrants to submit amended labels to California shortly after U.S. EPA acceptance. DPR has completed its pollinator label review and continues to monitor new product registrations to ensure labeling compliance. Improved pollinator protective labels are currently in the California marketplace.

In June 2014, DPR held a workshop to educate and inform beekeepers, biologists, and County Agricultural Commissioners on how to identify bee hive disease and pests. The workshop addressed how to investigate incidents of bee colony damage where pesticides are suspected of playing a role. DPR will work closely with beekeepers to prevent problems.

On June 20, 2014, a Presidential Memorandum creating a federal strategy to promote the health of honey bees and other pollinators was signed. In June 2014, a DPR, U.S. EPA, and PMRA Health Canada collaborative document entitled, *Guidance for Assessing Pesticide Risks to Bees* was completed and posted on U.S. EPA's Pollinator Protection Web site. DPR continues to work closely with U.S. EPA and PMRA Health Canada. U.S. EPA is requiring neonicotinoid registrants to conduct semi-field (Tier II) honey bee feeding studies on each of the four ingredients. Imidacloprid registrants submitted their final feeding study report to all three agencies in December 2014. Thiamethoxam and clothianidin studies are underway with final reports anticipated in the fourth quarter of 2015. In addition, PMRA Health Canada and

U.S. EPA is requiring imidacloprid registrants to conduct a full-field (Tier III) honeybee study in 2015. DPR provided input on the study parameters for both the Tier II and Tier III studies, and will review the protocols and results. DPR is in the process of actively analyzing crop residue and toxicity data, and is working closely with its partners to investigate honey bee chronic effects and other possible studies that would be scientifically meaningful to the reevaluation.

For more information on this reevaluation, please visit: <http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/neonicotinoids.htm>.

II. PRELIMINARY INVESTIGATIONS (EVALUATIONS)

DPR conducts preliminary investigations of products (and active ingredients) for which the department, 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 actively working on ways to improve the reevaluation program. For more information on the reevaluation program, please visit: <http://www.cdpr.ca.gov/docs/registration/reevaluation/reevals.htm>.

For more information, please contact either Ms. Denise Alder at <Denise.Alder@cdpr.ca.gov> or by telephone at (916) 324-3522, or Mr. Carlos Gutierrez at <Carlos.Gutierrez@cdpr.ca.gov> or by telephone at (916) 445-2885.

Original signed by — *March 10, 2015*

Ann M. Prichard, Chief
Pesticide Registration Branch
916-324-3931

Date

cc: Ms. Denise Alder, DPR Senior Environmental Scientist (Specialist)
Mr. Carlos Gutierrez, DPR Environmental Scientist