UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

RURAL COALITION, PESTICIDE ACTION NETWORK NORTH AMERICA, BEYOND PESTICIDES, CENTER FOR BIOLOGICAL DIVERSITY, and CENTER FOR FOOD SAFETY, *Petitioners*, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, and ANDREW WHEELER, in his official capacity as Administrator, *Respondents*.	**Case No.** **PETITION FOR REVIEW**

PETITION FOR REVIEW

Pursuant to Section 16(b) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. § 136n(b), and Rule 15(a) of the Federal Rules of Appellate Procedure, Petitioners Rural Coalition,

Pesticide Action Network North America, Beyond Pesticides, Center for Biological Diversity, and Center for Food Safety (collectively, Petitioners) petition this Court to review the orders of the United States Environmental Protection Agency (EPA) approving the interim registration review decisions for the herbicides atrazine, propazine, and simazine (collectively, the triazines). *See* Exhibits A-C (the Interim Registrations).

EPA signed the order approving the interim registration review decision of propazine on September 2, 2020, EPA Docket No. EPA-HQ-OPP-2013-0250. *See* Exhibit A. EPA signed the order approving the interim registration review decision of simazine on September 10, 2020, EPA Docket No. EPA-HQ-OPP-2013-0251. *See* Exhibit B. EPA signed the order approving the interim registration review decision of atrazine on September 14, 2020, EPA Docket No. EPA-HQ-OPP-2013-0266. *See* Exhibit C. EPA announced the availability of the Interim Registrations on September 18, 2020. [1]

[1] Press Release, EPA, *EPA Administrator Wheeler Meets with Farmers and Local Official on Efforts to Provide Regulatory Certainty* (Sept. 18, 2020), https://www.epa.gov/newsreleases/epa-administrator-wheeler-meets-farmers-and-local-officials-efforts-provide-regulatory.

Petitioners allege that EPA violated its duties under FIFRA in approving the Interim Registrations, and that the Interim Registrations lack support in substantial evidence. As such, Petitioners respectfully petition this Court to: (1) set aside the Interim Registrations attached as Exhibits A–C in whole or in part; (2) grant relief as may be necessary and appropriate to stop the use and sale of pesticides authorized by the Interim Registrations after vacatur; and (3) grant any other relief as may be appropriate.

Respectfully submitted this 30th day of October, 2020.

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Exhibit A

to Petition for Review

Docket Number EPA-HQ-OPP-2013-0250
www.regulations.gov

Propazine

Interim Registration Review Decision
Case Number 0230

September 2020

Approved by: _____

Elissa Reaves, Ph.D.
Acting Director
Pesticide Re-evaluation Division

Date: 09-2-2020

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I. INTRODUCTION

This document is the Environmental Protection Agency's (EPA or the Agency) Interim Registration Review Decision (ID) for propazine (PC Code 080808, case 0230) and is being issued pursuant to 40 CFR §§ 155.56 and 155.58. A registration review decision is the Agency's determination whether a pesticide continues to meet, or does not meet, the standard for registration in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The Agency may issue, when it determines it to be appropriate, an interim registration review decision before completing a registration review. Among other things, the interim registration review decision may determine that new risk mitigation measures are necessary, identify data or information required to complete the review, and include schedules for submitting the required data, conducting the new risk assessment and completing the registration review. Additional information on propazine can be found in EPA's public docket (EPA-HQ-OPP-2013-0250) at www.regulations.gov.

FIFRA, as amended by the Food Quality Protection Act (FQPA) of 1996, mandates the continuous review of existing pesticides. All pesticides distributed or sold in the United States must be registered by EPA based on scientific data showing that they will not cause unreasonable risks to human health or to the environment when used as directed on product labeling. The registration review program is intended to make sure that, as the ability to assess and reduce risk evolves and as policies and practices change, all registered pesticides continue to meet the statutory standard of no unreasonable adverse effects. Changes in science, public policy, and pesticide use practices will occur over time. Through the registration review program, the Agency periodically re-evaluates pesticides to make sure that as these changes occur, products in the marketplace can continue to be used safely. Information on this program is provided at http://www.epa.gov/pesticide-reevaluation. In 2006, the Agency implemented the registration review program pursuant to FIFRA § 3(g) and will review each registered pesticide every 15 years to determine whether it continues to meet the FIFRA standard for registration.

EPA is issuing an ID for propazine so that it can (1) move forward with aspects of the registration review that are complete and (2) implement interim risk mitigation (see Appendices A and B). The Agency is currently working with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (collectively referred to as, "the Services") to improve the consultation process for threatened and endangered (listed) species for pesticides in accordance with the Endangered Species Act (ESA) § 7. The Agency will complete its listed species assessment and any necessary consultation with the Services for propazine prior to completing the propazine registration review. Likewise, the Agency will complete endocrine screening for propazine, pursuant to the Federal Food, Drug, and Cosmetic Act (FFDCA) § 408(p), before completing registration review.

Propazine is an herbicide with products registered for use in sorghum to control broadleaf and grass weeds. It is a member of the triazine chemical class, which includes atrazine and simazine and the three major chloro-metabolites: desethyl-s-atrazine (DEA), desisopropyl-s-atrazine (DIA), and diaminochlorotriazine (DACT). Of the three major triazine chloro metabolites, only DEA and DACT are metabolites of propazine. EPA has determined that the triazines and their degradates share a common mechanism of toxicity, and as such, human health risks were

assessed together through a triazine cumulative risk assessment.[1] Each of the triazines produces a hydroxy degradate (i.e. hydroxypropazine) that has a different mode of action from the parent and major chloro-metabolites. One pesticide product containing propazine is registered for use on grain sorghum. The previously registered use on containerized ornamental plants grown in greenhouses was cancelled in January 2020 and subsequently removed from labels.[2] There are no registered residential uses of propazine. The first product containing propazine was registered in 1998, and therefore propazine was not subject to reregistration under FIFRA section 4, which was the process to re-evaluate pesticides registered prior to November 1, 1984. There is one technical and end-use registrant for propazine: Albaugh, LLC.

This document is organized in five sections: *Introduction*, which includes this summary and a summary of public comments and EPA's responses; *Use and Usage*, which describes how and why propazine is used and summarizes data on its use; *Scientific Assessments*, which summarizes EPA's risk and benefits assessments, updates or revisions to previous risk assessments, and provides broader context with a discussion of risk characterization; *Interim Registration Review Decision*, which describes the mitigation measures necessary to address risks of concern and the regulatory rationale for EPA's ID; and, lastly, *Next Steps and Timeline* for completion of this registration review case.

A. Update Since the Proposed Interim Decision

In January 2020, EPA published the Proposed Interim Registration Review Decision (PID) for propazine. In this ID, there is no update to the mitigation that was proposed in the PID.

Endangered Species Assessment
Propazine is one of the chemicals mentioned in a stipulated partial settlement agreement in the case of Center for Biological Diversity et. al., v. United States Environmental Protection Agency et al., No. 3:11 cv 0293 (N.D. Cal.). Among other provisions, this agreement sets a September 28, 2021 deadline for EPA to complete nationwide ESA section 7(a)(2) effects determination for atrazine and simazine and, as appropriate, request initiation of any ESA section 7(a)(2) consultations with the Services that EPA may determine to be necessary as a result of those effects determinations. EPA also stated in this settlement that the Agency would also include propazine in this group of effects determinations. Prior to completing the effects determination, the Agency plans to issue a draft biological evaluation for atrazine, simazine, and propazine for a 60-day public comment period by the end of November 2020.

In an effort to streamline and improve the biological evaluation and any subsequent consultations with the Services, as appropriate, Albaugh LLC, the sole propazine registrant, voluntarily committed to modifying propazine product labels and registrations.[3] Albaugh has committed to limit the use of propazine on sorghum to the states of Texas, Oklahoma, and Kansas only. This label change is expected to reduce the extent of exposure and risk to both listed and non-listed

[1] Chlorotriazines: Cumulative Risk Assessment – Atrazine, Propazine, and Simazine; on regulations.com at https://www.regulations.gov/document?D=EPA-HQ-OPP-2013-0250-0069.
[2] Federal Register Notice (Cancellation Order for Certain Pesticide Registrations and Amendments to Terminate Uses; Volume 85, No. 2; January 3, 2020; EPA–HQ–OPP–2018–0014; FRL–10002–91)
[3] See registrant commitment letter located in the propazine docket at EPA-HQ-OPP-2013-0250.

species whose range and/or habitat co-occur with the use of propazine. EPA will work with Albaugh to implement these voluntary label changes on the same timeframe as the necessary mitigation measures described in Section IV of this ID.

Along with the ID, the following documents are also posted to the propazine registration review docket (EPA-HQ-OPP-2013-0250):

- *Atrazine, Simazine, and Propazine —Environmental Fate and Effects Division's Response to Public Comments on Preliminary Interim Decision (PID)*, August 24, 2020
- *Biological and Economic Analysis Division's (BEAD) Response to Comments on the Benefit Assessments for Triazine Use on Field Corn, Sorghum, Fallow, Sweet Corn, Sugarcane, Orchards, Vineyards, Caneberries, Strawberries, Christmas Trees, Forestry, Rights-of-Way, Turfgrass, and Nurseries*, September 10, 2020
- *Atrazine, Simazine, Propazine: Human Health Response to Public Comments on Proposed Interim Decision*, September 9, 2020

B. Summary of Propazine Registration Review

Pursuant to 40 CFR § 155.50, EPA formally initiated registration review for propazine with the opening of the registration review docket for the case (EPA-HQ-OPP-2013-0250). The following summary highlights the docket opening and other significant milestones that have occurred thus far during the registration review of propazine.

- June 2013 - The *Propazine Preliminary Work Plan* (PWP) (June 2013)*; Atrazine, Propazine, and Simazine. Human Health Risk Scoping Document in Support of Registration Review* (June 2013), and *Registration Review: Problem Formulation for Environmental Fate and Ecological Risk, Endangered Species, and Drinking Water Assessments for Propazine* (May 2013) were posted to the docket for a 60-day public comment period.

- January 2014 - The *Propazine Final Work Plan* (FWP) was issued. The Agency received two sets of public comments concerning the PWP from the technical registrant for propazine, Albaugh, Inc., and the FIFRA Endangered Species Task Force (FESTF). The comments did not result in a change to the schedule, risk assessment needs, or anticipated data requirements in the FWP. In the PWP, EPA also solicited comments about the specific topics of environmental justice, water quality concerns, and trade irritants, but no comments or information were received concerning those issues.

- April 2014 – A Generic Data Call-In (GDCI) for propazine was issued for data needed to conduct the registration review risk assessments (GDCI-080808-1371). All data were submitted, and the GDCI is satisfied. A subsequent GDCI was issued on December 2018 requiring multiresidue testing (OSCPP 860.1360) for propazine and its chloro metabolites: DEA and DACT. This study was determined to be acceptable, and the GDCI is satisfied.

- June 2016 and July 2018 - The Agency announced the availability of *Preliminary Ecological Risk Assessment for Registration Review of Propazine*; *Propazine. Draft Human Health Risk Assessment for Registration Review;* and *Chlorotriazines: Cumulative Risk Assessment – Atrazine, Propazine, and Simazine*; respectively for public comment periods. 1,225 comments specific to propazine were received during the comment periods.

- January 2020 - EPA announced the availability of the PID in the propazine docket and opened a 60-day public comment period. Along with the PID, the following documents were posted to the propazine docket:

    - *Atrazine, Simazine, Propazine: Response to Public Comments on Registration Review Human Health Risk Assessments*, November 21, 2019
    - *Propazine – EFED Response to Public Comments Received on the Preliminary Risk Assessment for Registration Review*, November 21, 2019
    - *Atrazine and Propazine Use on Grain Sorghum and Fallow Areas: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation*, November 25, 2019

  Fifteen public comments were received on the PID. These comments and the Agency's responses are summarized below. The comments did not change the risk mitigation or registration review timeline for propazine.

- September 2020 - EPA has completed the ID for propazine. Along with the ID, the following documents will be posted to the propazine docket:

    - *Atrazine, Simazine, and Propazine —Environmental Fate and Effects Division's Response to Public Comments on Preliminary Interim Decision (PID),* August 24, 2020
    - *Atrazine, Simazine, Propazine: Human Health Response to Public Comments on Proposed Interim Decision*, September 9, 2020
    - *Biological and Economic Analysis Division's (BEAD) Response to Comments on the Benefit Assessments for Triazine Use on Field Corn, Sorghum, Fallow, Sweet Corn, Sugarcane, Orchards, Vineyards, Caneberries, Strawberries, Christmas Trees, Forestry, Rights-of-Way, Turfgrass, and Nurseries,* September 10, 2020

C. Summary of Public Comments on the Proposed Interim Decision

During the 60-day public comment period for the propazine PID, which opened on January 2, 2020, and closed on March 2, 2020, the Agency received 15 public comments. Comments were submitted by the U.S. Department of Agriculture (USDA), National Agricultural Aviation Association (NAAA), Natural Resources Defense Council (NRDC), farmers, and citizens. The USDA provided supportive comments of propazine use and EPA's mitigation along with some spray drift mitigation concerns as well as provided information about its use and usage. The NAAA supports aerial applications of propazine and recommended new temperature inversion label language. The NRDC provided comments of a technical nature about the triazines as well

as comments questioning whether EPA was using its regulatory authority to prevent unsafe exposures of propazine to humans and the environment. The remaining comments submitted to the propazine docket included comments for or against triazine use (some of which mention propazine; others were specific to simazine and atrazine only), and a generic comment about pesticides not specific to the triazines or propazine.

Comments of a technical nature concerning the propazine PID are summarized and addressed in the *Atrazine, Simazine, and Propazine —Environmental Fate and Effects Division's Response to Public Comments on Preliminary Interim Decision (PID), Atrazine, Simazine, Propazine: Human Health Response to Public Comments on Proposed Interim Decision,* and *Biological and Economic Analysis Division's (BEAD) Response to Comments on the Benefit Assessments for Triazine Use on Field Corn, Sorghum, Fallow, Sweet Corn, Sugarcane, Orchards, Vineyards, Caneberries, Strawberries, Christmas Trees, Forestry, Rights-of-Way, Turfgrass, and Nurseries.* For additional details, please refer to these documents which will be posted on the propazine registration review docket (EPA-HQ-OPP-2013-0250 on www.regulations.gov). Substantive comments, comments of a broader regulatory nature, and the Agency's responses to those comments are summarized below. The Agency thanks all commenters for their comments and has considered them in developing this ID.

Comments Submitted by USDA (Docket ID: EPA-HQ-OPP-2013-0250-0097)

Comment: USDA supports the standardization of the proposed label changes related to spray drift mitigation, but encourages EPA to allow growers some flexibility with application timing and droplet sizes, especially in circumstances in which applications are made prior to crop emergence to bare soil. USDA expresses concern that such restrictions may lead growers to use alternative herbicides with less favorable ecological toxicity profiles and weaker residual control, resulting in increased weed management efforts required later in the growing season when injury to crops may be more likely to occur.

EPA Response: EPA thanks USDA for its comments. EPA has determined that the spray drift mitigation is necessary to reduce potential risks to birds, mammals, and non-target plants.

Comments Submitted by NAAA (Docket ID: EPA-HQ-OPP-2013-0250-0105)

Comment: NAAA supports the spray drift mitigation language for propazine. NAAA supports label language of not applying during temperature inversions but suggests amending it to "do not apply during low-level temperature inversions."

EPA Response: EPA believes that the phrase "do not apply during low-level temperature inversions" does not provide adequate clarification due to the difficulty of defining the altitude where inversion conditions may not impact drift. Thus, the Agency is not specifying "low-level."

Comments Submitted by NRDC (Docket ID: EPA-HQ-OPP-2013-0250-0106)

Comment: NRDC states that EPA has failed to use its regulatory authority to prevent unsafe exposures of triazines, such as propazine. NRDC argues that the proposed label warnings as well

as mandatory and advisory label language will not ensure protection of human health and the environment.

EPA Response: EPA has performed risks assessments to ascertain where propazine exposure might cause potential risks in human health and the environment. No risk was determined for humans, but some risks were determined for birds, mammals, and non-target plants. EPA is requiring mitigation measures to reduce these risks. Although advisory language is not enforceable, the combination of mandatory and advisory label language provides knowledge of how to safely and legally handle and apply propazine.

II. USE AND USAGE

Propazine is a selective herbicide that is grouped by the Weed Science Society of America with other triazines in Class 5. Propazine has residual activity and can prevent weeds from emerging for several weeks. The primary target pests based on data from Kynetec AgroTrak and extension literature are pigweed species.

Sorghum is the only crop that has recorded propazine usage. Based on the available pesticide usage data, growers apply propazine to 4% of the sorghum crop and treat a total of 309,000 acres per year. The average number of applications per year is slightly over one application and the average single application rate is 0.71 pounds of active ingredient per acre.

Most sorghum growers apply propazine before crop emergence (80% of acres treated). Propazine can be applied by ground equipment or by air. Annually, propazine was applied by air to an average of 1,200 acres over the years 2013-2017 in Texas and Kansas only. All aerial applications were done with liquid formulations.[4]

III. SCIENTIFIC ASSESSMENTS

A. Human Health Risk

A summary of the Agency's human health risk assessment is presented below. The Agency used the most current science policies and risk assessment methodologies to prepare a risk assessment in support of the registration review of propazine. The EPA has made a determination of a common mechanism of toxicity for propazine, atrazine, and simazine (the triazines) and their chlorinated metabolites. Therefore, in addition to assessing potential risk from propazine, the EPA evaluated the potential cumulative risk from combined exposure to the triazines and their metabolites. For additional details on the human health assessments, see the *Propazine Draft Human Health Risk Assessment for Registration Review* and the *Chlorotriazines: Cumulative Risk Assessment: Atrazine, Propazine, and Simazine*, which are available in the public docket.

[4] Kynetec USA, Inc. 2019, The AgroTrak Study, Database Subset: 2013-2017.

1. Risk Summary and Characterization

There are no dietary, residential (handler and post-application), aggregate, non-occupational spray drift, or occupational post-application risk estimates of concern for the registered uses of propazine. Occupational handler (combined dermal and inhalation exposure) risk estimates of concern with baseline attire and label-specified PPE (chemical resistant gloves) were identified for some worker scenarios for the greenhouse ornamental use; however, the greenhouse ornamental use has been voluntarily cancelled.[5] See below for details.

Dietary (Food + Water) Risks

Anticipated food exposures to propazine is negligible. Based on available food consumption survey data and pesticide field trial residue studies, human exposure to propazine residues from sorghum use is considered negligible.[6] With insignificant exposure to propazine in food expected from the current uses, the total dietary exposure to propazine and its metabolites is through drinking water. A drinking water level of comparison (DWLOC) approach was used to calculate potential drinking water exposure and risk to propazine and its major chloro metabolites, as well as hydroxypropazine residues of concern. No dietary (drinking water) risks of concern were identified. For propazine and its major chloro metabolites, the acute and 4-day DWLOCs are greater than estimated drinking water concentrations (EDWCs). For propazine, the 4-day dietary risk estimates are protective for chronic dietary exposures since the point of departure and endpoint used for the 4-day assessment are the most sensitive for any exposure duration. For hydroxypropazine, the chronic DWLOCs are greater than the EDWCs. Therefore, there are no dietary (drinking water) risks of concern for propazine and its major chloro metabolites or hydroxypropazine.

Residential Handler and Post-Application Risks

There are no registered residential uses of propazine. Consequently, no risk assessment was performed for these scenarios.

Aggregate Risks

Aggregate risk assessment considers combined risks from food, drinking water, and residential exposures. There are no residential uses of propazine, and exposures from food are not expected. Exposures are only expected from drinking water, and there are no risks of concern for this pathway. Therefore, there are no aggregate risks of concern for propazine.
Non-Occupational Spray Drift Risks

A quantitative non-occupational spray drift assessment was conducted for propazine use on sorghum (1.2 lb ai/A) to assess potential exposure from off-target movement and deposition of

[5] Federal Register Notice (Cancellation Order for Certain Pesticide Registrations and Amendments to Terminate Uses; Volume 85, No. 2; January 3, 2020; EPA–HQ–OPP–2018–0014; FRL–10002–91)
[6] *What We Eat in America* (WWEIA/NHANES). 2003-2010. USDA and DHHS surveys report no human consumption for sorghum grain. In addition, field trial studies have demonstrated that residues of propazine and its metabolites are less than the limit of quantification (LOQ) of the analytical test method in sorghum grain.

propazine (i.e., spray drift); spray drift is not an issue for the now cancelled use on greenhouse ornamentals. Adult dermal and children's (1 to < 2 years old) dermal and incidental oral risk estimates from spray drift exposure to propazine from use on sorghum were not of concern at the edge of the field assuming screening-level nozzle types and droplet sizes (MOEs > the level of concern (LOC) of 30).

Cumulative Risks

The EPA has determined that propazine shares a common mechanism of toxicity (neuroendocrine effects in rats that can cause developmental and reproductive toxicity) with the other triazine herbicides, atrazine and simazine, and their chlorinated metabolites (DEA, DIA, and DACT). The EPA assessed cumulative risk from the triazines and their chlorinated metabolites in the July 10, 2018 document titled *Chlorotriazines: Cumulative Risk Assessment - Atrazine, Propazine, and Simazine* which is available in the public docket.

There were no risks of concern identified for the chlorotriazine 4-day cumulative dietary (food only) exposure and risk assessment or for the 4-day dietary cumulative aggregate (food + drinking water) exposure and risk assessment. There were also no cumulative risks of concern for the chronic dietary (food only) or screening-level aggregate (food + drinking water) assessment for the hydroxytriazines.

There were some 4-day cumulative aggregate (food + drinking water + residential) exposures; however, these risks of concern were driven by residential uses of simazine and atrazine. Propazine did not contribute to the aforementioned 4-day cumulative aggregate (food + drinking water + residential) exposures as there are no registered residential uses of propazine. Further information regarding these cumulative aggregate risks of concern can be found in *Chlorotriazines: Cumulative Risk Assessment - Atrazine, Propazine, and Simazine.*

Occupational Handler Risks

Occupational handler dermal and inhalation exposure and risk estimates were calculated for the registered uses of propazine on sorghum and greenhouse ornamentals. The occupational handler exposure and risk estimates indicate that some of the combined dermal and inhalation risk estimates are not of concern (MOEs > 30) with baseline attire + label specified PPE (chemical resistant gloves) for greenhouse ornamental use. Mixing/loading/applying liquids via backpack spray equipment to greenhouse ornamentals is not of concern with the addition of a double layer of clothing. Mixing/loading/applying liquids with a mechanically pressurized handgun to greenhouse ornamentals remains of concern when assuming label-specified PPE, a double layer of clothing, and a respirator with a protection factor of 10 (PF10 respirator). Dermal exposures are the highest contributors to the combined dermal + inhalation risk estimates. The propazine registrant has voluntarily cancelled the greenhouse use which nullifies these risks.[7] Occupational handler risks of concern were not identified from use on sorghum.

[7] Federal Register Notice (Cancellation Order for Certain Pesticide Registrations and Amendments to Terminate Uses; Volume 85, No. 2; January 3, 2020; EPA–HQ–OPP–2018–0014; FRL–10002–91)

Occupational Post-Application Risks

Occupational post-application dermal exposure and risk estimates were assessed for registered uses of propazine (sorghum and greenhouse-grown ornamentals). Although there are no chemical-specific dislodgeable foliar residue (DFR) data available for propazine, DFR data are available on field corn treated with liquid and dry flowable formulations of atrazine which are considered protective of propazine use. Using atrazine-specific DFR data, the occupational post-application MOEs (range from 120 to 2,500) are not of concern for the registered uses of propazine on the day of application (LOC = 30, where MOEs below the LOC are of concern).

2. Human Incidents and Epidemiology

The Agency performed an updated Tier I review of human incidents from 2010-2017 for the triazine herbicides (atrazine, propazine and simazine) using the following sources: OPP Incident Data System (IDS); the National Pesticide Information Center (NPIC); the California Pesticide Illness Surveillance Program (CA PISP); and the Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (CDC/NIOSH) Sentinel Event Notification System for Occupational Risk-Pesticides (SENSOR) databases (S. Recore *et. al*., D444041, 11/01/2017). The Agricultural Health Study (AHS) findings and epidemiological investigations for the triazines are reviewed in separate documents (the *Atrazine: Tier II Epidemiology Report* and the *Simiazine: Tier II Epidemiology Report*).

No propazine incidents were reported to IDS, NPIC, CA PISP, or SENSOR-Pesticides and there does not appear to be a concern at this time. The Agency will continue to monitor the incident information and additional analyses will be conducted if ongoing incident monitoring indicates a concern.

The Agency recently conducted an updated epidemiology systematic literature review to investigate evidence about the human health effects associated with exposure to atrazine, simazine, and/or propazine. Ninety-three publications from 1990 – 2017 were identified for inclusion in the epidemiology literature review. Of these 93 publications, 90% reported an estimate of effect for atrazine and 14% reported an estimate of effect for simazine (not mutually exclusive). No epidemiology studies were found for propazine. However, since atrazine, simazine and propazine share a common mechanism of toxicity, refer to the *Atrazine Draft Human Health Risk Assessment for Registration Review* (docket EPA-HQ-OPP-2013-0266) and the *Simazine Human Health Risk Assessment for Registration Review and to Support the Registration of Proposed Uses on Citrus Fruit (Crop Group 10-10), Pome Fruit (Crop Group 11-10), Stone Fruit (Crop Group 12-12), Tree Nuts (Crop Group 14-12), and Tolerance Amendment for Almond Hulls* (docket EPA-HQ-OPP-2013-0251) for additional information regarding the human health effects associated with certain triazines.

3. Tolerances

Tolerances are established under 40 CFR §180.243 for residues of propazine in/on sorghum commodities. In a separate action, EPA will use its Federal Food, Drug, and Cosmetic Act

(FFDCA) rulemaking authority to require tolerance changes which will have a public comment period. The Agency intends to require that the residue definition for the tolerance expression for propazine be modified in accordance with current policy on tolerance definitions, to read:

"Tolerances are established for residues of the herbicide propazine, including its metabolites and degradates, in or on the commodities in the table below. Compliance with the tolerance levels specified below is to be determined by measuring only the sum of propazine, 6-chloro-N,N'-bis(1-methylethyl)-1,3,5-triazine-2,4-diamine, its desisopropyl metabolite 2-amino-4-chloro-6-isopropylamino-s-triazine (G-30033) (DEA), and its diamino metabolite 2,4-diamino-6-chloro-s-triazine (G-28273) (DACT), calculated as the stoichiometric equivalent of propazine, in or on the commodity."

The Agency intends to revise the propazine tolerances for sorghum commodities. The anticipated revised tolerances are lower than the established tolerances and are based on limit of quantification (LOQ) considerations. Table 1 lists the anticipated tolerance revisions for propazine.

No Codex or Canada Pest Management Regulatory Agency (PMRA) maximum residue levels (MRLs) have been established for propazine. There are no harmonization issues at this time.

Table 1: Summary of Anticipated Tolerance Revisions for Propazine (40 CFR §180.243)

Commodity/ Correct Commodity Definition	Established Tolerance (ppm)	Anticipated Revised Tolerance (ppm)	Comments
Sorghum, grain, forage	0.25	0.2	Sum of LOQs for propazine and DEA plus maximum level of DACT in forage
Sorghum, grain, grain	0.25	0.15	Sum of LOQs: no detects in grain
Sorghum, grain, stover	0.25	0.15	Sum of LOQs: no detects in stover

B. Ecological Risk Summary and Characterization

A summary of EPA's ecological risk assessment was originally presented in the propazine PID; there have been no changes in the Agency's ecological risk assessment since the publication of the propazine PID. The only current registered use of propazine is on sorghum.

The EPA calculated risk estimates associated with propazine use to non-target mammals; birds, reptiles and terrestrial-phase amphibians; terrestrial invertebrates; terrestrial plants; fish, amphibians, and aquatic invertebrates; and aquatic vascular and nonvascular plants. Risk estimates (risk quotients, or RQs) were compared with the EPA's LOC. For ecological risk, RQ's below the LOC are not of concern to the Agency. For all taxa in the terrestrial assessment, except for plants, the LOC for acute exposure is 0.5, and the LOC for chronic exposure is 1.0. The LOC for plants is 1.0. In the draft risk assessment, the Agency identified potential chronic risk concerns for mammals, birds, reptiles, and terrestrial-phase amphibians. Risks from spray drift were identified for terrestrial and aquatic nonvascular plants. In addition, available information suggests potential risk to terrestrial invertebrates. The draft risk assessment assessed

the maximum label number of applications and maximum application rate (1.2 lb. a.i./A/application).

Terrestrial Risks

Mammals

Propazine has no known acute effect on mammals, and the likelihood of acute risk is low. The chronic risk estimates exceed the Agency's LOC of 1 for most scenarios modeled for all uses. Chronic RQs range from 0.16 – 25, compared to the LOC of 1.0, based on on-field exposure estimates.

Birds, Reptiles, and Terrestrial-Phase Amphibians

Acute RQs were calculated using the the highest concentration tested, because the avian endpoints were non-definitive (i.e., greater than values). The highest acute RQ value is 0.28, and acute risks to birds are expected to be low. Chronic risk estimates minimally exceed the Agency's LOC of 1 (chronic RQ = 1.1, LOC = 1). The adverse effect upon which the chronic endpoint is based is adult female body weight gain.

Terrestrial Invertebrates (honeybees)

No effects on adult honeybees were observed in the available acute contact study, and therefore no RQs are calculated. The potential risk to larval honeybees is not defined at this time based on current information.

Although the EPA identified the need for certain data to evaluate potential ecological effects to non-target organisms when initially scoping the registration review for propazine, the ecological effects problem formulation and the May 2014 registration review DCI were both issued prior to the EPA's issuance of the June 2014 *Guidance for Assessing Pesticide Risks to Bees*[8]. The EPA is currently determining whether additional pollinator data are needed for propazine. If the Agency determines that additional pollinator exposure and effects data are necessary to help make a final registration review decision for propazine, then the EPA will issue a DCI to obtain these data. The pollinator studies that could be necessary are listed in Table 2 below and based on the EPA's June 2014 *Guidance for Assessing Pesticide Risks to Bees*.

Table 1: Potential Pollinator Data Requirements

Guideline #	Study
Tier 1	
850.3020	Acute contact toxicity study with adult honey bees
850.3030	Honey bee toxicity of residues on foliage
Non-Guideline (OECD 213)	Honey bee adult acute oral toxicity
Non-Guideline (OECD 237)	Honey bee larvae acute oral toxicity
Non-Guideline	Honey bee adult chronic oral toxicity
Non-Guideline	Honey bee larvae chronic oral toxicity
Tier 2†	

[8] Available at https://www.epa.gov/sites/production/files/2014-06/documents/pollinator_risk_assessment_guidance_06_19_14.pdf

Table 1: Potential Pollinator Data Requirements	
Guideline #	**Study**
Non-Guideline	Field trial of residues in pollen and nectar
Non-Guideline (OECD 75)	Semi-field testing for pollinators (tunnel or colony feeding study)
Tier 3†	
850.3040	Full-Field testing for pollinators

† The need for higher tier tests for pollinators will be determined based upon the results of lower tiered tests and/or other lines of evidence and the need for a refined pollinator risk assessment.

Terrestrial Plants

There were risks of concern for terrestrial plants. Effects were seen in both seedling emergence and vegetative vigor studies in both monocots and dicots, more so for dicots. The EPA used a 25% inhibition of growth endpoint focusing on either biomass or emergence. For aerial applictions, RQs ranged from 1.71 to 11.25 for non-listed plants, which exceeded the LOC of 1. Aerial spray drift RQs ranged from 1.71 to 3.75, where the LOC is 1.

For ground applications, RQs ranged from 0.69 to 8.25 for non-listed plants. Ground spray drift RQs were not of concern for non-listed terrestrial plants. RQ numbers exceeding the LOC indicate a potential for risk to that plant group.

Aquatic Risks

Fish, Amphibians, and Aquatic Invertebrates

There are no risks of concern for fish, amphibians, and aquatic invertebrates.

Aquatic Vascular and Nonvascular Plants

There is no risk of concern for aquatic vascular plants from the propazine use on sorghum (RQ = 0.32 – 0.43; LOC = 1). There is a risk of concern for aquatic nonvascular plants from the propazine use on sorghum via aerial and ground spray drift with RQs (1.3 – 1.7) exceeding the LOC of 1.

For additional details on the ecological assessment for propazine, see the *Preliminary Risk Assessment for Registration Review of Propazine* and *Propazine: Addendum to "Preliminary Risk Assessment for Registration Review of Propazine" for Update on ECOTOX Database Query* which are available in the public docket.

1. Ecological Incidents

The last search for ecological incidents was conducted in 2015 in support of risk assessment. The Ecological Incident Information System (EIIS) and the Avian Incident Monitoring System (AIMS) were searched. When available, ecological incident reports include data and location of an incident, type and magnitude of effects observed in various species, use(s) of pesticides known or suspected of contributing to the incident, and results of any chemical residue analysis or other analyses conducted during incident investigation. Ecological incidents are categorized

according to the certainty that the incident resulted from pesticide exposure. The 2015 incident search did not identify any incidents attributed to propazine.

EIIS and AIMS were later combined into the Incident Data System (IDS). An updated search for new incidents was conducted in IDS in October 2019, and there are no reported incidents for propazine .

The absence of reported incidents should not be interpreted as an absence of incidents. Incident reports for non-target organisms typically provide information only on mortality events and plant damage. Sublethal effects in organisms such as abnormal behavior, reduced growth and/or impaired reproduction are rarely reported, except for phytotoxic effects in terrestrial plants.

The Agency will continue to monitor ecological incident information as it is reported to the Agency. Detailed analyses of these incidents are conducted if reported information indicates concerns for risk to non-target organisms.

C. Benefits Assessment

Flexible Use Pattern
Propazine can be applied either before or after the crop emerges. Additionally, propazine has residual activity and can prevent weeds from emerging for several weeks.

Crop Safety
Propazine is one of three herbicides registered for use on sorghum that do not require a seed safener to prevent injury to the emerging crop. Saflufenacil and atrazine are the other sorghum use herbicides that do not require a safener. Generally, propazine offers better crop safety to grain sorghum than atrazine.

Inexpensive
Propazine is a relatively inexpensive herbicide, at approximately $4/acre to apply, on average; as compared to a commonly used preemergence active ingredient, metolachlor-S, at $10/acre. Propazine is mostly used before crop emergence when control of weed pests is paramount to establishing a crop which significantly reduces the probability of incurring some yield and financial loss.

IV. INTERIM REGISTRATION REVIEW DECISION

A. Required Risk Mitigation and Regulatory Rationale

The Agency has reviewed the risks, benefits, and uses of propazine and has determined that risk mitigation is necessary. EPA identified potential human health risks of concern for occupational handlers from dermal and inhalation exposure scenarios, such as mixing/loading/applying using backpack sprayers and mechanically pressurized handgun application equipment for greenhouse ornamental use; however, this use was voluntarily cancelled (see below). EPA identified

cumulative risks for the triazines which stem from atrazine and simazine uses, but not propazine use. EPA has also identified potential ecological risks of concern for mammals, birds, terrestrial plants, and non-vascular aquatic plants. The Agency weighed the benefits against the potential ecological risks and determined that mandatory spray drift language will reduce ecological exposure of propazine in the environment. EPA determined with this reduction in exposure that the benefits of the use of propazine on sorghum outweigh the remaining ecological risks of concern. In addition to the need for updated mandatory spray drift management language, EPA has determined that updating the herbicide resistance management language, personal protective equipment (gloves), and some label clarification on the propazine label are necessary. The registrant has agreed to all of the necessary label changes for propazine. Therefore, EPA has determined that with the mitigation measures noted here, the benefits of the use of propazine on sorghum outweigh any risks of concern.

1. Cancellation of Greenhouse Use

The registrant voluntarily cancelled the greenhouse use, and the cancellation order was published in the Federal Register Notice (Cancellation Order for Certain Pesticide Registrations and Amendments to Terminate Uses; Volume 85, No. 2; January 3, 2020; EPA–HQ–OPP–2018–0014; FRL–10002–91). This nullifies the occupational handler risks of concern for dermal and inhalation exposures that were identified for greenhouse uses.

2. Mandatory Spray Drift Reduction

The Agency determined that label changes are necessary to reduce off-target spray drift and establish a baseline level of protection against spray drift that is consistent across propazine products. Reducing spray drift is expected to minimize the extent of environmental exposure and potential risk to non-target plants and animals, including listed species whose range and/or critical habitat co-occur with the use of propazine. These spray drift reduction measures will also be considered in EPA's forthcoming effects determination, and consultation with the Services, as appropriate. Although the Agency is not making a complete endangered species finding at this time, these label changes are expected to reduce the extent of exposure and may reduce risk to listed species whose range and/or critical habitat co-occur with the use of propazine.

EPA determined that the following spray drift mitigation language to be included on all propazine product labels for products applied by liquid spray application is necessary. These additional restrictions include mandatory, enforceable statements and supersede any existing language already on product labels (either advisory or mandatory) covering the same topics. The Agency also determined that standardizing all advisory language on propazine product labels is necessary. When requesting label amendments to add these new statements, registrants must ensure that any existing advisory language left on labels does not contradict or modify the new mandatory spray drift statements required in this ID, once effective.

- Applicators must not spray during temperature inversions.
- For aerial applications, do not apply when wind speeds exceed 15 mph at the application site. If the windspeed is greater than 10 mph, the boom length must be 65% or less of the wingspan for fixed wing aircraft and 75% or less of the rotor diameter for helicopters.

Otherwise, the boom length must be 75% or less of the wingspan for fixed-wing aircraft and 90% or less of the rotor diameter for helicopters.

- For aerial applications, if the windspeed is 10 miles per hour or less, applicators must use ½ swath displacement upwind at the downwind edge of the field. When the windspeed is between 11-15 miles per hour, applicators must use ¾ swath displacement upwind at the downwind edge of the field.
- For aerial applications, the release height must be no higher than 10 feet from the top of the crop canopy or ground, unless a greater application height is required for pilot safety.
- For groundboom applications, do not apply when wind speeds exceed 15 mph at the application site.
- For ground boom applications, apply with the release height no more than 4 feet above the ground or crop canopy.
- For ground and/or aerial applications, select nozzle and pressure that deliver medium or courser droplets as indicated in nozzle manufacturers' catalogues and in accordance with the most recent version of American Society of Agricultural & Biological Engineers Standard 572 (ASABE S572).

In addition to including the spray drift restrictions on propazine labels, all references to volumetric mean diameter (VMD) information for spray droplets need to be removed from all propazine labels where such information currently appears. The proposed new language above, which cites ASABE S572, eliminates the need for VMD information.

Expected Impacts of the Mandatory Spray Drift Mitigation

The agency assessed the impact of the mandatory spray drift reduction measures outlined previously. Spray drift reduction requirements might impact sorghum growers in the following manner:

- inversion restriction (reducing amount of time to apply propazine, consumer might switch to product with only advisory language),
- percent of usable boom length and wind speed restrictions (increasing flexibility of applications),
- mandatory maximum spray release height requirement for ground applications (no negative impact),
- windspeed restrictions for ground applications (reducing amount of time to apply propazine,
- grower adopting other more costly control strategy, potential yield losses),
- droplet size (potential reducing efficacy, increasing potential for herbicide resistance, increasing application rates used by growers, increasing costs associated with reduced yield, more herbicide applications, purchasing of alternative products, or not being able to use tank mix or premix products), and
- interaction of individual components of spray drift mitigation (reducing amount of time to apply propazine).

For additional details on the impacts to sorghum growers from required spray drift reduction language, please see Section IV.6 of the PID and *Atrazine and Propazine Use on Grain Sorghum*

and Fallow Areas: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080808) which are available on the public docket (EPA-HQ-OPP-2013-0250).

3. Non-target Advisory

EPA has determined that a non-target organism advisory is necessary label language for propazine. The protection of pollinating organisms is a priority for the Agency. Propazine may negatively impact forage and habitat of pollinators and other non-target organisms. It is the Agency's goal to reduce spray drift whenever possible and to educate growers on the potential for indirect effects on the forage and habitat of pollinators and other non-target organisms. Therefore, EPA determined that a non-target organism advisory language is necessary on propazine labels to address this potential concern.

4. Herbicide Resistance Management

On August 24, 2017, EPA finalized a Pesticide Registration Notice (PRN) on herbicide resistance management.[9] Consistent with the Notice, EPA has determined that the implementation of herbicide resistance measures for existing chemicals during registration review is necessary. In registration review, herbicide resistance elements will be considered and addressed in every herbicide PID.

The development and spread of herbicide resistant weeds in agriculture is a widespread problem that has the potential to fundamentally change production practices in U.S. agriculture. While herbicide resistant weeds have been known since the 1950s, the number of species and their geographical extent, has been increasing rapidly. Currently there are over 250 weed species worldwide with confirmed herbicide resistance. In the United States, there are over 155 weed species with confirmed resistance to one or more herbicides.

Management of herbicide resistant weeds, both in mitigating established herbicide resistant weeds and in slowing or preventing the development of new herbicide resistant weeds, is a complex problem without a simple solution. Coordinated efforts of growers, agricultural extension, academic researcher, scientific societies, pesticide registrants, and state and federal agencies are required to address this problem.

EPA determined that labeling statements are necessary to provide growers and users with detailed information and recommendations to slow the development and spread of herbicide resistant weeds. This is part of a more holistic, proactive approach recommended by crop consultants, commodity organizations, professional/scientific societies, researchers, and the registrants themselves.

[9] PRN 2017-2, "Guidance for Herbicide Resistance Management Labeling, Education, Training, and Stewardship". Available at https://www.epa.gov/pesticide-registration/pesticide-registration-notices-year

5. Label Cleanup

The Agency determined that three items for label cleanup as stated below are necessary.

- The Agency has determined that an update to the glove statement currently on labels to be consistent with the Label Review Manual is necessary.[10] The new mandatory glove language does not fundamentally change the personal protective equipment that workers need to use, and therefore should impose no impacts on users.
- The Agency has determined that the standardization of the following information on product labels near application rate tables is necessary: "Do not apply propazine if atrazine has been or will be applied to the same acreage in the same growing season." This text already appears in the end use product, but not the technical product.

B. Tolerance Actions

EPA anticipates revising the tolerance expression and tolerances for several commodities. Refer to Section III.A.3 for details. The Agency will use its FFDCA rulemaking authority to address these needed changes to the tolerances.

C. Interim Registration Review Decision

In accordance with 40 CFR §§ 155.56 and 155.58, the Agency is issuing this ID. Except for the Endocrine Disruptor Screening Program (EDSP) and the Endangered Species Act (ESA) components of this case, the Agency has made the following interim decision: (1) no additional data are required at this time; and (2) changes to the affected registrations and their labeling are needed at this time, as described in Section IV. A and Appendices A and B.

In this ID, the Agency is making no human health or environmental safety findings associated with the EDSP screening of propazine, nor is it making a final endangered species finding. Although the Agency is not making a final endangered species finding at this time, the required mitigation described in this document, when implemented on labels, is expected to reduce the extent of environmental exposure and may reduce risk to listed species whose range and/or critical habitat co-occur with the use of propazine. The Agency's final registration review decision for propazine will be dependent upon the result of the Agency's ESA assessment and any needed § 7 consultation with the Services and an EDSP FFDCA § 408(p) determination.

There are no human health risks of concern for registered uses of propazine. EPA identified cumulative risks for the triazines which stem from atrazine and simazine uses but not propazine use. EPA has also identified potential ecological risks of concern for mammals, birds, terrestrial plants, and non-vascular aquatic plants. The Agency weighed the benefits against the potential ecological risks and determined that mandatory spray drift language will reduce ecological exposure of propazine in the environment. EPA determined with this reduction in exposure that

[10] See https://www.epa.gov/sites/production/files/2016-02/documents/chap-10-feb-2016.pdf

the benefits of the use of propazine on sorghum (i.e. flexible use pattern, crop safety, and inexpensive) outweigh the remaining ecological risks of concern. Besides mandatory spray drift management language, EPA has determined that updating the herbicide resistance management language, revising the personal protective equipment (gloves) statement, and adding some label clarification on the propazine label are necessary to follow best management practices.

D. Data Requirements

The propazine registration review generic data call-in issued in 2014 (GDCI-080808-1371) has been satisfied. EPA issued a second propazine registration review DCI in 2018 (GDCI-080808-1776) requiring multiresidue testing (OSCPP 860.1360) for propazine and its chloro metabolites: DEA and DACT. These data have been submitted and found to be acceptable, therefore this data call-in has been satisfied. No additional pollinator data are anticipated to be needed to be called-in for this registration review at this time. EPA will consider if submission of pollinator data is necessary as a separate action.

The analytical reference standard for propazine's chloro metabolite DACT has expired and must be submitted to EPA's National Pesticide Standards Repository (see https://www.epa.gov/pesticide-analytical-methods/national-pesticide-standard-repository).

V. NEXT STEPS AND TIMELINE

A. Interim Registration Review Decision

A Federal Register Notice will announce the availability of this ID for propazine. A final decision for propazine will occur after: (1) an EDSP FFDCA § 408(p) determination and (2) an endangered species determination under the ESA and any needed § 7 consultation with the Services.

B. Implementation of Mitigation Measures

Once the Interim Registration Review Decision is issued, the propazine registrants must submit amended labels that include the label changes described in Appendices A and B. The revised labels and requests for amendment of registrations must be submitted to the Agency for review within 60 days following issuance of the Interim Registration Review Decision in the docket.

Registrants must submit a cover letter, a completed Application for Registration (EPA form 8570-1) and electronic copies of the amended product labels. Two copies for each label must be submitted, a clean copy and an annotated copy with changes. In order for the application to be processed, registrants must include the following statement on the Application for Registration (EPA form 8570-1):

"I certify that this amendment satisfies the requirements of the Propazine Interim Registration Review Decision and EPA regulations at 40 CFR Section 152.44, and no other changes have

been made to the labeling of this product. I understand that it is a violation of 18 U.S.C. Section 1001 to willfully make any false statement to EPA. I further understand that if this amendment is found not to satisfy the requirements of the Propazine Interim Registration Review Decision and 40 CFR Section 152.44, this product may be in violation of FIFRA and may be subject to regulatory and/or enforcement action and penalties under FIFRA."

Within the required timeframe, registrants must submit the required documents to the Re-evaluation section of EPA's Pesticide Submission Portal (PSP), which can be accessed through EPA's Central Data Exchange (CDX) using the following link: https://cdx.epa.gov/. Registrants may instead send paper copies of their amended product labels, with an application for a fast-track, Agency-initiated non-PRIA label amendment to Carolyn Smith at one of the following addresses, so long as the labels and application are submitted within the required timeframe:

VIA US Mail
USEPA Office of Pesticide Programs
Pesticide Re-evaluation Division
Mail Code 7508P
1200 Pennsylvania Ave NW
Washington, DC 20460-0001

VIA Courier
Pesticide Re-evaluation Division
c/o Front End Processing
Room S-4910, One Potomac Yard
2777 South Crystal Drive
Arlington, VA 22202-4501

Appendix A: Summary of Required Actions for Propazine

Registration Review Case#: 0230
PC Code: 080808
Chemical Type: herbicide
Chemical Family: triazine
Mechanism of Action: inhibiting photosynthesis in photosystem II (PSII)

Affected Population(s)	Source of Exposure	Route of Exposure	Duration of Exposure	Potential Risk(s) of Concern	Required Actions	Comment (use to briefly clarify or elaborate on risk or mitigation)
Occupational handler (for greenhouse ornamentals)	Dermal and inhalation	Dermal and inhalation	Short and intermediate term	Neurological, reproductive, developmental effects	Cancel greenhouse ornamental use and remove use from labels	Greenhouse use was voluntarily cancelled
Avian	Dietary and spray drift	Ingestion	Chronic	Growth	Enforceable spray drift management measures	Chronic dietary RQ = 1.1 which marginally exceeds the LOC of 1
Mammals	Dietary and spray drift	Ingestion	Chronic	Reproductive and Growth	Enforceable spray drift management measures	
Terrestrial Plants	Spray drift	Direct contact	Acute Chronic	Growth	Enforceable spray drift management measures	Aerial spray drift modeling showed RQs from 1.71 – 3.75 which exceed the LOC of 1
Aquatic plants (nonvascular)	Spray drift and runoff	Direct contact	Acute Chronic	Growth	Enforceable spray drift management measures	Aerial and ground spray modeling showed RQs from 1.3 – 1.7 which exceed the LOC of 1

Docket Number EPA-HQ-OPP-2013-0250
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Appendix B: Required Labeling Changes for Propazine Products

<table>
<tr><th>Description</th><th>Required Label Language for Propazine Products</th><th>Placement on Label</th></tr>
<tr><td></td><td>Technical Product</td><td></td></tr>
<tr><td>Removal of Greenhouse Use Pattern and Use Site</td><td>Remove “greenhouse weeds” / “in greenhouses” wording[i]</td><td>Title/Directions for Use</td></tr>
<tr><td>Do not apply in same acreage and same growing season as atrazine</td><td>“Do not apply propazine if atrazine has been or will be applied to the same acreage in the same growing season.”</td><td>Directions for Use</td></tr>
<tr><td></td><td>End Use Product</td><td></td></tr>
<tr><td>Removal of Greenhouse Use</td><td>Remove wording referring to container grown ornamentals in greenhouses use[ii]</td><td>Title, Greenhouse Application Instructions</td></tr>
<tr><td>Mechanism of Action Group Number</td><td>Note to registrant:
• Include the name of the ACTIVE INGREDIENT in the first column
• Include the word “GROUP” in the second column
• Include the MODE/MECHANISM/SITE OF ACTION CODE in the third column (for herbicides this is the Mechanism of Action, for fungicides this is the FRAC Code, and for insecticides this is the Primary Site of Action)
• Include the type of pesticide (i.e., HERBICIDE or FUNGICIDE or INSECTICIDE) in the fourth column.
<table><tr><td>PROPAZINE</td><td>GROUP</td><td>5</td><td>HERBICIDE</td></tr></table></td><td>Front Panel, upper right quadrant.
All text should be black, bold face and all caps on a white background, except the mode of action code, which should be white, bold face and all caps on a black background; all text and columns should be surrounded by a black rectangle.</td></tr>
<tr><td>Updated Gloves Statement</td><td>Update the glove statements to be consistent with Chapter 10 of the Label Review Manual. The propazine end-use product contains outdated glove statements. All appropriate glove types must be identified on the label (not named as</td><td>In the Personal Protective Equipment (PPE) within the</td></tr>
</table>

Description	Required Label Language for Propazine Products	Placement on Label
	examples). Registrants are no longer allowed to reference solvent categories (A-H) or category charts on the product labels.	Precautionary Statements and Agricultural Use Requirements, if applicable
Non-target Organism Advisory	"NON-TARGET ORGANISM ADVISORY: This product is toxic to plants and may adversely impact the forage and habitat of non-target organisms, including pollinators, in areas adjacent to the treated site. Protect the forage and habitat of non-target organisms by following label directions intended to minimize spray drift."	Environmental Hazards
HERBICIDE RESISTANCE MANAGEMENT: Weed Resistance Management	Include resistance management label language for herbicides from PRN 2017-1 and PRN 2017-2 (https://www.epa.gov/pesticide-registration/pesticide-registration-notices-year)	Directions for Use, prior to directions for specific crops under the heading "WEED RESISTANCE-MANAGEMENT"
Additional Required Labelling Action **Applies to all products delivered via liquid spray applications**	Remove information about volumetric mean diameter from all labels where such information currently appears.	Directions for Use
Spray Drift Management Application Restrictions for all products delivered via liquid spray application and allow aerial application	"**MANDATORY SPRAY DRIFT MANAGEMENT** **Aerial Applications:** • Do not release spray at a height greater than 10 ft above the ground or vegetative canopy, unless a greater application height is necessary for pilot safety. • Applicators are required to use a medium or coarser droplet size (ASABE S572 and S641). • If the windspeed is 10 miles per hour or less, applicators must use ½ swath displacement upwind at the downwind edge of the field. When the windspeed is between 11-15 miles per hour, applicators must use ¾ swath displacement upwind at the downwind edge of the field. • Do not apply when wind speeds exceed 15 mph at the application site. If the windspeed is greater than 10 mph, the boom length must be 65% or less of the wingspan for fixed wing aircraft and 75% or less of the rotor diameter for	Directions for Use, in a box titled "Mandatory Spray Drift Managment" under the heading "Aerial Applications"

Description	Required Label Language for Propazine Products	Placement on Label
	helicopters. Otherwise, the boom length must be 75% or less of the wingspan for fixed-wing aircraft and 90% or less of the rotor diameter for helicopters. • Do not apply during temperature inversions."	
Spray Drift Management Application Restrictions for products that are applied as liquids and allow ground boom applications	"**MANDATORY SPRAY DRIFT MANAGEMENT** **Ground Boom Applications:** • User must only apply with the release height recommended by the manufacturer, but no more than 4 feet above the ground or crop canopy. • Applicators are required to use a medium or coarser droplet size (ASABE S572). • Do not apply when wind speeds exceed 15 miles per hour at the application site. • Do not apply during temperature inversions."	Directions for Use, in a box titled "Mandatory Spray Drift Management" under the heading "Ground Boom Applications"
Advisory Spray Drift Management Language for all products delivered via liquid spray application	"**SPRAY DRIFT ADVISORIES** THE APPLICATOR IS RESPONSIBLE FOR AVOIDING OFF-SITE SPRAY DRIFT. BE AWARE OF NEARBY NON-TARGET SITES AND ENVIRONMENTAL CONDITIONS. **IMPORTANCE OF DROPLET SIZE** An effective way to reduce spray drift is to apply large droplets. Use the largest droplets that provide target pest control. While applying larger droplets will reduce spray drift, the potential for drift will be greater if applications are made improperly or under unfavorable environmental conditions. **Controlling Droplet Size – Ground Boom** (note to registrants: remove if ground boom is prohibited on product labels) • Volume - Increasing the spray volume so that larger droplets are produced will reduce spray drift. Use the highest practical spray volume for the application. If a greater spray volume is needed, consider using a nozzle with a higher flow rate. • Pressure - Use the lowest spray pressure recommended for the nozzle to produce the target spray volume and droplet size. • Spray Nozzle - Use a spray nozzle that is designed for the intended application. Consider using nozzles designed to reduce drift. **Controlling Droplet Size – Aircraft** (**note to registrants**: remove if aerial application is prohibited on product labels) • Adjust Nozzles - Follow nozzle manufacturers' recommendations for setting up nozzles. Generally, to reduce fine droplets, nozzles should be oriented parallel with the airflow in flight. **BOOM HEIGHT – Ground Boom** (**note to registrants**: remove if ground boom is prohibited on product labels)	Directions for Use, just below the Spray Drift box, under the heading "Spray Drift Advisories"

Description	Required Label Language for Propazine Products	Placement on Label
	For ground equipment, the boom should remain level with the crop and have minimal bounce. **RELEASE HEIGHT** - **Aircraft** (**note to registrants**: remove if aerial application is prohibited on product labels) Higher release heights increase the potential for spray drift. **SHIELDED SPRAYERS** Shielding the boom or individual nozzles can reduce spray drift. Consider using shielded sprayers. Verify that the shields are not interfering with the uniform deposition of the spray on the target area. **TEMPERATURE AND HUMIDITY** When making applications in hot and dry conditions, use larger droplets to reduce effects of evaporation. **TEMPERATURE INVERSIONS** Drift potential is high during a temperature inversion. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. The presence of an inversion can be indicated by ground fog or by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing. Avoid applications during temperature inversions. **WIND** Drift potential generally increases with wind speed. AVOID APPLICATIONS DURING GUSTY WIND CONDITIONS. Applicators need to be familiar with local wind patterns and terrain that could affect spray drift."	

[i] Label for 42750-149 has already been amended to incorporate this change; label stamped 5/14/20
[ii] Label for 42750-148 has already been amended to incorporate this change: label stamped 6/11/20

Exhibit B

to Petition for Review

Simazine

Interim Registration Review Decision
Case Number 0070

September 2020

Approved by: _____

Elissa Reaves, Ph.D.
Acting Director
Pesticide Re-evaluation Division

Date: 09/10/2020

Table of Contents

Docket Number EPA-HQ-OPP-2013-0251
www.regulations.gov

I. INTRODUCTION

This document is the Environmental Protection Agency's (EPA or the Agency) Interim Registration Review Decision (ID) for simazine (PC Code 080807, case 0070), and is being issued pursuant to 40 CFR §§ 155.56 and 155.58. A registration review decision is the Agency's determination whether a pesticide continues to meet, or does not meet, the standard for registration in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The Agency may issue, when it determines it to be appropriate, an interim registration review decision before completing a registration review. Among other things, the interim registration review decision may determine that new risk mitigation measures are necessary, identify data or information required to complete the review, and include schedules for submitting the required data, conducting the new risk assessment and completing the registration review. Additional information on simazine, can be found in EPA's public docket (EPA-HQ-OPP-2013-0251) at www.regulations.gov.

FIFRA, as amended by the Food Quality Protection Act (FQPA) of 1996, mandates the continuous review of existing pesticides. All pesticides distributed or sold in the United States must be registered by EPA based on scientific data showing that they will not cause unreasonable risks to human health or to the environment when used as directed on product labeling. The registration review program is intended to make sure that, as the ability to assess and reduce risk evolves and as policies and practices change, all registered pesticides continue to meet the statutory standard of no unreasonable adverse effects. Changes in science, public policy, and pesticide use practices will occur over time. Through the registration review program, the Agency periodically re-evaluates pesticides to make sure that as these changes occur, products in the marketplace can continue to be used safely. Information on this program is provided at http://www.epa.gov/pesticide-reevaluation. In 2006, the agency implemented the registration review program pursuant to FIFRA § 3(g) and will review each registered pesticide every 15 years to determine whether it continues to meet the FIFRA standard for registration.

EPA is issuing an ID for simazine so that it can (1) move forward with aspects of the registration review that are complete and (2) implement interim risk mitigation (see Appendices A and B). The Agency is currently working with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (collectively referred to as, "the Services") improve the consultation process for threatened and endangered (listed) species for pesticides in accordance with the Endangered Species Act (ESA) § 7. The Agency will complete its listed species assessment and any necessary consultation with the Services for simazine prior to completing the simazine registration review.

Simazine is an herbicide with products registered for use to control broadleaf and grassy weeds. Simazine is a member of the triazine chemical class (Class 5), which includes atrazine and propazine and the three major chloro metabolites: desethyl-s-atrazine (DEA), desisopropyl-s-atrazine (DIA), and diaminochlorotriazine (DACT). EPA has determined that the triazines and their three chlorinated metabolites share a common mechanism of toxicity, and as such, human health risks were assessed together through a triazine cumulative risk assessment. Pesticide products containing simazine are registered for use on several agricultural crops, most common of which are corn and citrus. Simazine products are also registered for several non-agricultural use sites, including residential and recreational settings. Common non-agricultural uses include

turf, nurseries, greenhouse and ornamentals. The first product containing simazine was registered in 1958, and therefore simazine was subject to reregistration under FIFRA section 4. There are three technical product registrants for simazine: Drexel Chemical Company, Oxon Italia, and Syngenta Crop Protection, LLC.

This document is organized in five sections: the *Introduction*, which includes this summary and a summary of public comments and EPA's responses; *Use and Usage*, which describes how and why simazine is used and summarizes data on its use; *Scientific Assessments*, which summarizes EPA's risk and benefits assessments, updates or revisions to previous risk assessments, and provides broader context with a discussion of risk characterization; the *Interim Registration Review Decision*, which describes the mitigation measures necessary to address risks of concern and the regulatory rationale for EPA's ID; and, lastly, the *Next Steps and Timeline* for completion of this registration review.

A. Updates Since the Proposed Interim Registration Review Decision was Issued

Residential Turf Mitigation

In January 2020, the Agency published the PID for simazine and took public comment for 60 days. The Agency received comments from the USDA, Sipcam Argo USA, Inc and Syngenta regarding EPA's proposal in the simazine PID to cancel simazine residential turf uses (to mitigate potential post-application residential risks of concern). Each of the commenters articulated the benefits of preserving the registered residential turf use. In addition, the registrants submitted data during the comment period that demonstrated residue decline on turf after irrigation and proposed an alterative mitigation measure of requiring that 0.5 inches of water be applied immediately upon simazine's application to residential turf. The Agency has reviewed the proposal and supporting data and has determined there are no post-application residential risks of concern for residential turf use if the maximum turf application rate is reduced from 2 lb ai/A to 1.6 lb ai/A with the added irrigation (i.e., watering-in with 0.5 inches of water immediately after application) (dermal MOE = 64 , LOC = 30). If registrants choose to not adopt the label requirements for watering in simazine with 0.5 inches of water immediately after application to residential turf at a maximum rate of 1.6 lb ai/A, then the maximum application rate must be reduced further to 0.65 lb ai/A to address the potential residential post-application turf risks of concern (dermal MOE = 67, LOC = 30). There are no residential post-application risks of concern at either of the rate and application parameters specified above. A more detailed response to this comment/proposal can be found in the document, *Atrazine, Simazine, Propazine: Response to Public Comments on Proposed Interim Decision*, which addresses technical comments received on the draft human health risk assessment and is available in the public docket.

Endangered Species Assessment

Simazine is one of the chemicals mentioned in a stipulated partial settlement agreement in the case of Center for Biological Diversity et. al., v. United States Environmental Protection Agency et al., No. 3:11 cv 0293 (N.D. Cal.). Among other provisions, this agreement sets a September 28, 2021 deadline for EPA to complete nationwide ESA section 7(a)(2) effects determination for atrazine and simazine and, as appropriate, request initiation of any ESA section 7(a)(2)

consultations with the Services that EPA may determine to be necessary as a result of those effects determinations. EPA also stated in this settlement that the Agency would also include propazine in this group of effects determinations. Prior to completing the effects determination, the Agency plans to issue a draft biological evaluation for atrazine, simazine, and propazine for a 60-day public comment period by the end of November 2020.

In an effort to streamline and improve the biological evaluation and any subsequent consultations with the Services, as appropriate, the simazine technical registrants Drexel Chemical Company, Sipcam Argo USA, Inc, and Syngenta Crop Protection, LLC voluntarily committed to making several modifications to simazine product labels and registrations.[1] In addition to removing several use patterns, simazine technical registrants have committed to implementing certain geographic restrictions and buffers from listed species' locations and/or critical habitats. These label changes are expected to reduce the extent of exposure and risk to both listed and non-listed species whose range and/or habitat co-occur with the use of simazine. EPA will work with registrants to implement these voluntary label changes on the same timeframe as the necessary mitigation measures described in Section IV of this ID. In addition, for label modifications that are subject to the use deletion process under FIFRA 6(f), EPA will announce these modifications in the Federal Register and open a public comment period for a minimum of 30 days.

Simazine technical registrants have committed to the following voluntary label modifications:

- Prohibit all uses of simazine in Hawaii, Alaska, and the U.S. territories (Puerto Rico, Guam, American Samoa, the U.S. Virgin Islands, and the North Mariana Islands), thereby restricting registered uses to the contiguous United States.
- Remove "Shelterbelt" use
- Restrict forestry uses to "Christmas trees only"
- Restrict use on turf to "warm season turf" only
- Require an in-field downwind buffer of 15 feet (4.6 meters) for ground applications and 150 feet (46 meters) for aerial applications:
    - from the edge of all streams and rivers as well as the high-tide line for all estuarine/marine environments, and
    - from threatened and endangered species critical habitat and/or species locations.

B. Summary of Simazine Registration Review

Pursuant to 40 CFR § 155.50, EPA formally initiated registration review for simazine with the opening of the registration review docket for the case. The following summary highlights the docket opening and other significant milestones that have occurred thus far during the registration review of simazine.

- June 2013- The following documents were posted to the docket for a 60-day public comment period:
    - *Simazine Preliminary Work Plan* (PWP)

[1] See registrant commitment letters located in the simazine docket at EPA-HQ-OPP-2013-0251

  - Registration Review – *Preliminary Problem Formulation for the Ecological Risk Assessment for Atrazine, Propazine, and Simazine*
  - *Human Health Risk Scoping Document in Support of Registration Review*
  - Atrazine, Propazine, and Simazine: Review of Human Incidents
  - *BEAD Chemical Profile for Registration Review: Simazine (080807) Screening Level Usage Analysis (SLUA)*
  - *PRD Label Data Report: Food/Feed & Non-Food/Non-Feed Uses Considered in Registration Review Work Planning*

- January 2014 - The *Final Work Plan* (FWP) for simazine was issued. The Agency received 14 sets of public comments concerning the PWP. The comments did not change the schedule, risk assessment needs, or anticipated data requirements in the FWP.

- May 2014 - A Generic Data Call-In (GDCI) for simazine was issued for data needed to conduct the registration review risk assessments (GDCI-080807-1384). All data have been submitted and accepted.

- June 2016 - The Agency announced the availability of the *Preliminary Ecological Risk Assessment for Simazine* and took public comment for 120-days. 119 comments were received as well as another 88 that were posted on the shared triazine docket. These comments and the Agency's responses are summarized below. The comments resulted in the correction of some minor errors, which are discussed in the *Simazine—Environmental Fate and Effects Division's Response to Public Comments* document but did not impact the overall conclusions of the risk assessment.

- July 2018 – The Agency announced the availability of the *Simazine Human Health Risk Assessment for Registration Review to Support the Registration of Proposed Uses on Citrus Fruit (Crop Group 10-10), Pome Fruit (Crop Group 11-10), Stone Fruit (Crop Group 12/12), Tree Nuts (Crop Group 14-12), and tolerance Amendment for Almond Hulls* and the *Chlorotriazines: Cumulative Risk Assessment - Atrazine, Propazine, and Simazine* along with the supporting documents listed below, and took public comment for 120-days. . During that time 16public comments were received related to simazine.
  - *Cumulative Triazine (Atrazine, Simazine, Propazine) Drinking Water Assessment*
  - *Chlorotriazines. Toxicology Systematic Literature Review- Atrazine, Simazine and Propazine*
  - *Simazine Occupational and Residential Exposure and Risk Assessment for Registration Review and to Support the Registration of Proposed Uses Citrus Fruit (Crop Group 10-10), Pome Fruit (Crop Group 11-10), Stone Fruit (Crop Group 12-12), Tree Nuts (Crop Group 14-12), and Tolerance Amendment for Almond Hulls*
  - *Simazine. Acute 4-Day, Background, and Chronic Dietary (Food Only) Exposure and Risk Assessments for Registration Review*

- December 2018 - A Generic Data Call-In (GDCI) for simazine was issued for multiresidue data that was identified as a deficiency in the human health risk assessments. The required data are currently under development and due to be submitted to EPA by

December 20, 2020. These data are not expected to impact the Agency's ability to make a risk managment finding.

- January 2020 – The Agency announced the availability of the Proposed Interim Decision (PID) for simazine and took public comment for 60-days. In addition to the PID, the Agency published the following supporting documents.
    - *Simazine—Environmental Fate and Effects Division's Response to Public Comments*. November 25, 2019.
    - *Atrazine, Simazine, Propazine: Response to Public Comments on Registration Review Human Health Risk Assessments*. November 25, 2019.
    - *Atrazine and Simazine Use on Sweet Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)*. November 25, 2019.
    - *Atrazine and Simazine Use on Field Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)*. November 25, 2019.
    - *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits*. November 25, 2019.
    - *Simazine Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation on Orchards, Vineyards, Caneberries, Strawberries, and Christmas Trees.* November 25, 2019
- September 2020 - The Agency has completed the Interim Decision (ID) for simazine. Soon EPA will announce the availability of the ID in the simazine docket. Along with the ID, the following documents are also posted to the simazine docket: https://www.regulations.gov/docket?D=EPA-HQ-OPP-2013-0251
    - *Atrazine, Simazine, and Propazine —Environmental Fate and Effects Division's Response to Public Comments on Preliminary Interim Decision (PID),* 8/24/2020.
    - *Atrazine, Simazine, Propazine: Human Health Response to Public Comments on Proposed Interim Decision),* 9/9/2020.
    - *Biological and Economic Analysis Division's (BEAD) Response to Comments on the Benefit Assessments for Triazine Use on Field Corn, Sorghum, Fallow, Sweet Corn, Sugarcane, Orchards, Vineyards, Caneberries, Strawberries, Christmas Trees, Forestry, Rights-of-Way, Turfgrass, and Nurseries,* 9/10/2020.

C. Summary of Public Comments on the Proposed Interim Decision and Agency Responses

During the 60-day public comment period for the PID, which opened on January 2, 2020, and closed on March 2, 2020, the Agency received 21 unique comments specific to simazine. In addition, EPA received comments via mass mailers with a combined count of approximately 46,791 comments either supporting or opposing the continued registration of all three triazines, atrazine, propazine, and simazine. The unique comments specific to simazine discussed the impacts of proposed mitigation measures and/or provided information about the use and benefits of simazine to growers. Comments were submitted by individual citizens, the simazine technical registrants (Drexel Chemical Company, Sipcam Argo USA, Inc., Syngenta), various trade

organizations (e.g., agricultural growers and industry groups), and other non-governmental organizations.

Comments of a technical nature concerning the simazine PID are summarized and addressed in the *Atrazine, Simazine, and Propazine —Environmental Fate and Effects Division's Response to Public Comments on Preliminary Interim Decision (PID)* (8/24/2020.), the *Atrazine, Simazine, Propazine: Human Health Response to Public Comments on Proposed Interim Decision* (9/9/2020), and the *Biological and Economic Analysis Division's (BEAD) Response to Comments on the Benefit Assessments for Triazine Use on Field Corn, Sorghum, Fallow, Sweet Corn, Sugarcane, Orchards, Vineyards, Caneberries, Strawberries, Christmas Trees, Forestry, Rights-of-Way, Turfgrass, and Nurseries* (9/10/2020). For additional details please refer to these documents which will be posted on the simazine registration review docket (EPA-HQ-OPP-2013-0251 on www.regulations.gov). Substantive comments, comments of a broader regulatory nature, and the Agency's responses to those comments are summarized below. The Agency thanks all commenters for their comments and has considered them in developing this ID.

Comments Submitted by Sipcam Argo USA, Inc, Syngenta and USDA (Docket ID: EPA-HQ-OPP-2013-0251-153, EPA-HQ-OPP-2013-0251-0163, EPA-HQ-OPP-2013-0251-0166)

Comment: Sipcam Argo USA, Inc, Syngenta and the USDA commented on the Agency's proposed prohibition of simazine on residential turf. They suggested alternative mitigation of requiring irrigation after application (i.e., mandatory watering in of 0.5 inches of water immediately after application). The registrants provided data in support of their proposal, which shows residue decline on turf after irrigation.

EPA Response: The Agency reviewed the registrants' proposal and supporting data and has determined there are no post-application residential risks of concern for residential turf if the maximum application rate is reduced from 2 lbs ai/A to 1.6 lb ai/A with required irrigation (watering-in) of 0.5 inches of water immediately after application (Dermal MOE = 64, LOC =30). An alternative to the rate reduction to 1.6 lbs ai/A combined with the irrigation requirement that also mitigates the potential residential post-application turf risks of concern is a reduction of the maximum application rate to 0.65 lb ai/A (Dermal MOE = 67, LOC = 30). There are no residential post-application risks of concern at either of the rate and application parameters specified above. Having both options provides users flexibility to either use simazine at 1.6 lb ai/A and then irrigate or use simazine as part of a tank-mix or pre-mix at a reduced rate of 0.65 lbs a/A without irrigation. For more detail, see *Atrazine, Simazine, Propazine: Human Health Response to Public Comments on Proposed Interim Decision.*

Comments submitted by the National Agricultural Aviation Association (Docket ID: EPA-HQ-OPP-2013-0251-0161)

Comment: NAAA does not agree that registered uses for simazine do not allow aerial applications while other triazines (atrazine and propazine) do have aerial applications.

EPA Response: The aerial uses were prohibited as part of the *Reregistration Eligibility Decision for Simazine* in 2006 to mitigate potential drinking water and occupational handler risks of

concern that were identified at that time. Therefore, aerial was not assessed as part of the human health draft risk assessment for registration review. Further, if aerial uses were to be considered at the same application rates as allowed prior to the 2006 RED there likely would still be occupational risks of concern that would prohibit registration of that use.

II. USE AND USAGE

Simazine is a selective herbicide that prevents grass and broadleaf weeds from emerging. Simazine products are registered for agricultural use sites such as caneberries, grapes, strawberries, citrus fruits, nut crops, pome fruits, stone fruits, artichokes, corn, asparagus, uncultivated agricultural areas, kale, cabbage, kohlrabi, Brussel sprouts, blueberries, alfalfa, avocado, and olives. Products containing simazine are also registered for use on non-agricultural sites such as forest trees, ornamental herbaceous plants, ornamental lawns and turf, ornamental woody shrubs and vines, ornamental trees, Christmas tree farms, nursery stock, farm buildings, golf course turf, and shelterbelt plantings. Simazine is registered in liquid, dry flowable (DF), and water dispersible granule (WDG) formulations. Simazine can be applied via ground, chemigation, and handheld application equipment; aerial application is prohibited.

An average of 3 million pounds of simazine are applied to 2.6 million acres of agricultural cropland per year. Although simazine is not used extensively on major row crops (e.g., corn), these type of use sites do account for the majority of agricultural usage in terms of pounds applied and acres treated. Approximately 3% of corn acres in the U.S. are treated with simazine each year and this accounts for 76% of simazine use. Less than 1% of sweet corn acres are treated with simazine, or about 3,600 acres annually.

Simazine is used extensively in orchard, vineyard, and berry crop sites. On average, over 650,000 pounds, or approximately 20%, of simazine is applied in agricultural settings to these sites. The crops with the highest percent crop treated (PCT) with simazine are caneberries (32%), blueberries (20%), raisin grapes (17%), hazelnuts (16%), oranges (12%), and peaches (10%). All the orchard, vineyard, and berry crops surveyed typically received one to two applications of simazine per year on average. Citrus fruit (i.e. oranges, lemons, and grapefruit) typically have the highest reported average simazine application rates, around 2.2 lbs a.i./acre or higher.

In the most recent year with data available (2013-2016), thousands of pounds of simazine were applied to various non-agricultural use sites: nursery/ornamental (400,000 lbs), turf-sod farms (26,000 lbs), non-residential turfgrass [e.g., golf courses] (237,000 lbs) and forestry (less than 5,000 lbs).

III. SCIENTIFIC ASSESSMENTS

A. Human Health Risks

A summary of the Agency's human health risk assessments is presented below. The Agency used the most current science policies and risk assessment methodologies to prepare a risk assessment in support of the registration review of simazine. In addition, EPA has made a

determination of a common mechanism of toxicity for atrazine, simazine, propazine, and their chlorinated metabolites. Therefore, in addition to assessing potential risk from simazine, EPA evaluated the potential cumulative risk from combined exposure to the triazines and their three major chlorinated metabolites, desethyl-s-atrazine (DEA), desisopropyl-s-atrazine (DIA), and diaminochlorotriazine (DACT). For additional details on the human health assessments, see the *Simazine. Human Health Risk Assessment for Registration Review and to Support Registration of Proposed Uses on Citrus Fruit, Pome Fruit, Stone Fruit, Tree Nuts, and Tolerance Amendment for Almond Hulls*, the *Chlorotriazines: Cumulative Human Health Risk Assessment - Atrazine, Propazine, and Simazine*, and *Cumulative Triazine (Atrazine, Simazine, Propazine) Drinking Water Assessment*, which are available in the public docket.

For registration review, the predominant adverse health effect of concern for triazines is suppression of the luteinizing hormone (LH) surge leading to neuroendocrine effects. This effect was observed in rat studies after four days of exposure, therefore potential risk was assessed using a 4-day duration of exposure rather than EPA's typical short- or intermediate-term duration of exposure. Disruptive hormonal effects related to the LH surge are different for different age groups and sexes, and the downstream adverse effects vary considerably. Exposures during early life may lead to effects later in life including delays in sexual maturation, inflammation of the prostate, effects related to development of the genitalia, and/or irregular menstrual cycles. Therefore, this endpoint is relevant for males and females, and all life-stages.

For the acute assessment for simazine and its chlorinated metabolites, the toxicological endpoint is increased incidence of unossified teeth, head, centra vertebrae, and sternebrae, and also rudimentary ribs, which is only applicable to females 13-49 years old. For the 4-day assessment for simazine and its chlorinated metabolites, the toxicological endpoint is attenuation of LH surge, which is applicable to all life-stages. The hydroxy metabolites of simazine are major metabolites in plants but not in livestock. Dermal and inhalation exposures are not expected for the hydroxy metabolites of simazine; however, chronic dietary exposures are expected. The chronic endpoint (kidney effects) is applicable to all life-stages.

1. Risk Summary and Characterization

Dietary (Food + Water) Risks

EPA's dietary risk assessments did not identify any potential acute, 4-day, chronic, or cancer risks of concern associated with dietary exposure to simazine and its chlorinated metabolites or to the hydroxy metabolites of simazine. Simazine has been classified as "Not likely to be carcinogenic to humans"; therefore, a quantitative cancer dietary risk assessment was not conducted.

Residential Handler Risks

Simazine products are registered for use in residential areas (e.g., residential lawns and playgrounds). Although all simazine labels require that handlers wear specific clothing (e.g., long sleeved shirt, long pants) and/or use personal protective equipment (PPE), one label is

specifically labeled "for residential use" of simazine on residential turf. Therefore, a residential handler assessment was conducted for simazine application to residential turf. There were no residential handler combined (dermal + inhalation) risks of concern; combined (dermal + inhalation) Margins of Exposure (MOEs) ranged from 44 to 180 (Level of Concern (LOC)=30).

Residential Post-Application Risks

Residential post-application exposure is expected via the dermal route for adults, children 11 to 16 years old, children 6 to 11 years old, and children 1 to < 2 years old; and via incidental oral exposure (i.e., hand-to-mouth or object to mouth) for children 1 to < 2 years old as a result of being in an environment that was previously treated with simazine (e.g., lawns, golf courses, playgrounds, recreational areas, etc).

Since dermal and incidental oral exposure routes share a common toxicological endpoint, risk estimates have been combined for those routes for children 1 to < 2 years old. Chemical-specific predicted day zero turf transferrable residues were adjusted in the post-application assessment for any differences between the study application rate and the registered application rates for simazine. Then, a 4-day average residue was used to estimate risk from contact with treated turf because the point of departure (POD) is based on decreased LH surge and available toxicity data indicate that the decrease occurs after a 4-day exposure. EPA's assessment of these exposure pathways demonstrated potential post-application risks of concern (i.e., Margins of Exposure (MOEs) < the level of concern (LOC) of 30) from the currently labeled maximum application rates for spray applications for adults from dermal exposure and for children 1 to < 2 years old from combined dermal and incidental oral exposure to residential turf.

For adults, the dermal MOE resulting from contacting treated turf is 26 at the currently labeled maximum application rate of 2.0 lb ai/A. For children 1 to < 2 years old, the combined dermal and incidental oral MOE resulting from contacting treated turf is 17 at the currently labeled maximum application rate of 2.0 lb ai/A. If the maximum rate is reduced to 1.0 lb ai/A, there are no risk estimates of concern for adults or children 1 to < 2 years old (adult dermal MOE = 52 and combined dermal + incidental oral MOE for children 1 to < 2 years old = 33) from simazine alone. However, in the cumulative assessment (results summarized below), cumulative risks of concern were identified from the use of simazine on residential turf even at 1.0 lb ai/A. Cumulative risks of concern are present unless the rate for simazine use on turf is reduced to 0.65 lb ai/A or lower.

Non-Occupational Bystander Risks

In addition to potential exposure from application directly to residential turf treated with simazine, EPA assessed potential human exposure from off-target movement and deposition (i.e., spray drift) of simazine. Applications to grapefruit and oranges at the maximum application rate of 8.0 pounds per acre (lb/A) resulted in combined dermal + incidental oral risks of concern for children 1 to < 2 years old at the field edge. However, with existing spray drift mitigation on labels, along with the fact that applications to citrus orchards are made at least 10 feet from the edge of the field, there are no bystander risks of concern.

In addition, a non-occupational bystander exposure and risk assessment was conducted using the available application site and ambient volatilization monitoring data available for simazine. There are no risk estimates of concern for adults and children (MOEs $\geq$ 30) using either the maximum air concentration data from application site monitoring or using the average air concentration from all ambient air monitoring.

Aggregate Risks

There is the potential for aggregate risks of concern following exposure to simazine and its chlorinated metabolites (DEA, DIA, and DACT). EPA evaluated acute and 4-day aggregate exposure to simazine (dietary and residential), and chronic aggregate exposure to the hydroxy metabolites of simazine. The acute and chronic aggregate assessments include dietary (food-only) and drinking water. The 4-day aggregate assessment includes dietary (food-only), drinking water, and residential exposures.

EPA used a drinking water level of comparison (DWLOC) approach to evaluate aggregate risk. This approach determines acceptable levels of exposure in the total "risk cup" for drinking water, after accounting for exposures from food/residential uses. DWLOCs are then compared to estimated drinking water concentrations (EDWC) to determine whether there are aggregate risk concerns once exposure from drinking water is added in. The DWLOC approach is useful when there are multiple EDWCs, as is the case for simazine or when there are potential aggregate risk estimates of concern.

There were no acute risks of concern for simazine and its chlorinated metabolites, and no chronic aggregate risks of concern for the hydroxy metabolites of simazine. For the 4-day aggregate assessment, the maximum application rate on residential turf (2.0 lb ai/A) would need to be reduced to 0.65 lb ai/A to be not of concern for all subpopulations.

Cumulative Risks

EPA has determined that simazine shares a common mechanism of toxicity (neuroendocrine effects in rats that can cause developmental and reproductive toxicity) with the other triazine herbicides, atrazine and propazine, and their chlorinated metabolites. EPA assessed cumulative risk from the triazines and their chlorinated metabolites in the July 10, 2018 *Chlorotriazines: Cumulative Risk Assessment - Atrazine, Propazine, and Simazine*, which is available in the public docket.
There were no risks of concern identified for the chlorotriazine 4-day cumulative dietary (food only) exposure and risk assessment, or for the 4-day dietary cumulative aggregate (food + drinking water) exposure and risk assessment. There were also no cumulative risks of concern for the chronic dietary (food only) or screening-level aggregate (food + drinking water) assessment for the hydroxytriazines.

However, there were some 4-day cumulative aggregate (food + drinking water + residential) exposures that resulted in risks of concern at the maximum labeled rates for simazine spray application to residential turf at the maximum application rate (2.0 lb ai/A). However, if the

application rate is reduced to 0.65 lb ai/A for turf, there are no cumulative aggregate risks of concern.

Occupational Handler Risks

There is potential for occupational handler risk from combined dermal and inhalation exposure to simazine, with dermal exposure driving the risk estimates. EPA calculated risk estimates based on combined dermal and inhalation exposure for various levels of PPE; label-specified PPE (i.e., long sleeves, pants and socks and chemical resistant gloves), and any additional PPE or engineering controls required to result in risk estimates that are not of concern. The occupational handler scenarios evaluated resulted in potential risks of concern with MOEs ranging from 2.7 to 1,400 (LOC = 30) assuming label-specified PPE. Uses with potential occupational risks of concern are:

- Mixing/loading/applying dry flowable/water dispersible granule (DF/WDG) and liquid formulations for backpack application to grapefruit, oranges and landscape turf.
- Mixing/loading/applying DF/WDG and liquid for mechanically pressurized handgun application to:
    - Citrus (Grapefruit, Oranges, Lemons)
    - Pome Fruits (Apples, Pears)
    - Stone Fruits (Cherries [sweet and tart], peaches, Plums, Nectarines)
    - Tree Nuts (Pecans, Walnuts, Filberts, Almonds, Macadamia Nuts
    - Berry and Small Fruit (Blueberries, Blackberries, Loganberries, Raspberries, Grapes, Lowbush Blueberries, Cranberries)
    - Tropical and Sub-tropical Fruits (Avocado, Olive)
    - Nursery/Ornamentals
    - Sweet corn
    - Strawberries

Based on EPA's risk assessment, a requirement of additional PPE could eliminate potential risk for some but not all scenarios.

The scenarios for which potential occupational risks of concern remain (*i.e.,* MOEs remain below the LOC of 30) assuming the highest possible level of PPE and/or engineering controls include:

- Mixing/loading/applying DF/WDG and liquid formulations for broadcast backpack sprayer applications to landscape turf (MOE assuming a double layer of clothing, gloves, and a particulate filtering facepiece or elastomeric particulate respirator = 27).
- Mixing/loading/applying DF/WDG and liquid formulations for mechanically pressurized handgun applications to:
    - grapefruit and oranges (MOE assuming a double layer of clothing, gloves, and a particulate filtering facepiece or elastomeric particulate respirator = 4.4);
    - lemons, apples, pears, tart cherries, avocadoes, filberts, grapes, olives, peaches, plums, sweet cherries, pecans, walnuts (MOE assuming a double layer of clothing, gloves, and a particulate filtering facepiece or elastomeric particulate respirator = 8.7);
    - almonds, peaches, nectarines, macadamia nuts, blueberries, blackberries,

loganberries, raspberries (MOE assuming a double layer of clothing, gloves, and a particulate filtering facepiece or elastomeric particulate respirator = 18);
- nursery ornamentals (MOE assuming a double layer of clothing, gloves, and a particulate filtering facepiece or elastomeric particulate respirator = 12);
- lowbush blueberries (MOE assuming a double layer of clothing, gloves, and a particulate filtering facepiece or elastomeric particulate respirator = 18);
- cranberries (MOE assuming a double layer of clothing, gloves, and a PF 10 respirator = 8.7); and,
- sweet corn (MOE assuming a double layer of clothing, gloves, and a particulate filtering facepiece or elastomeric particulate respirator = 14).

The occupational handler exposure assessment relied on maximum registered application rates, generic handler data in absence of chemical-specific unit exposure data, standard area/amount treated assumptions. Registered simazine labels vary with respect to required attire and PPE. The DF/WDG labels require mixer/loaders for groundboom applications; and/or mixer/loaders, cleaners of equipment or spills, or other handlers otherwise exposed to the concentrate to wear baseline attire (long sleeved shirts, long pants, shoes, and socks), chemical resistant gloves, and a dust/mist respirator. Some labels also require mixer/loaders to wear a double layer of clothing or coveralls. All other handlers of DF/WDG products must wear baseline attire and chemical resistant gloves. All of the registered liquid labels require handlers to wear baseline attire and waterproof or chemical resistant gloves. Therefore, results were presented for "baseline attire," (long sleeved shirt, long pants, shoes plus socks), protective gloves, and no respirator; as well as baseline, gloves, and various levels of PPE as necessary (e.g., double layer of clothing, respirator, etc.).

Occupational Post-Application Risks

Using atrazine dislodgeable foliar residue (DFR) and simazine turf transferrable residue (TTR) data, there are no occupational post-application MOEs of concern for the registered and proposed uses of simazine on the day of application, except for hand-set irrigation for highbush and lowbush blueberries (MOE = 24; LOC=30). One day after application there are no risks of concern (MOE = 43). The Agency does not consider this a risk of concern because there is an existing restricted entry interval (REI) of 12 hours and the risk calculated at the maximum label rate of 4 lb ai/A is much lower than the typical use rate of 1.6 lb ai/A. All other registered uses had MOEs above the LOC.

2. Human Incidents and Epidemiology

Four minor severity incidents were reported in the OPP Incident Data System (IDS) between January 1, 2012 and January 12, 2017 involving simazine. A National Pesticide Information Center (NPIC) query from 2012 to 2017 found one minor severity incident involving simazine. A query of California Pesticide Illness Surveillance Program incidents from 2010 to 2014 found one incident involving simazine. Lastly, a query of Sentinel Event Notification System for Occupational Risk-Pesticides from 2010 to 2013 identified three cases involving simazine. Two cases were moderate in severity and one case was low in severity. All three cases were

occupational exposures. The Agency will continue to monitor the incident information. Additional analyses will be conducted if ongoing human incident monitoring indicates a concern.

The Agency recently conducted an updated epidemiology systematic literature review to investigate evidence about the human health effects potentially associated with exposure to atrazine, simazine, and/or propazine. Ninety-three publications from 1990 to 2017 were identified for inclusion in the epidemiology literature review. These publications investigated carcinogenic and noncarcinogenic effects (43% and 58%, respectively; not mutually exclusive). Most (88%) reported an effect estimate for atrazine, 14% reported an effect estimate for simazine (not mutually exclusive: some articles reported estimates for both chemicals, while other articles reported estimates for only one). No publications reported an effect estimate for propazine. Additional details can be found in *Chlorotriazines. Toxicology Systematic Literature Review-Atrazine, Simazine and Propazine.*

3. Tolerances

Tolerances are established under 40 CFR §180.213 for the combined residues of simazine and its two chlorinated metabolites in/on a variety of crops and livestock commodities. In a separate action, EPA will use its Federal Food, Drug, and Cosmetic Act (FFDCA) rulemaking authority to require tolerance changes which will have a public comment period. The Agency intends to establish, remove (delete), and/or update tolerances for the commodities listed in Table 1. Tolerances need to be updated in accordance with the Organisation for Economic Co-operation and Development (OECD) Rounding Class Practice. The tolerance's for almond, hulls and strawberry need to be revised based on individual field trial data. The Agency also needs to delete and/or establish several new tolerances in accordance with new crop groupings. The Agency also intends to require that the residue definition for the tolerance expression for simazine be modified in accordance with current policy on tolerance definitions, to read:

> *"Tolerances are established for residues of the herbicide simazine, including its metabolites and degradates, in or on the commodities in the table below. Compliance with the tolerance levels specified below is to be determined by measuring only the sum of simazine, 6-chloro-N,N'-diethyl-1,3,5-triazine-2,4-diamine, its desethyl metabolite 2-amino-4-chloro-6-ethylamino-s-triazine (G-28279) (DIA), and its diamino metabolite 2,4-diamino-6-chloro-s-triazine (G-28273) (DACT), calculated as the stoichiometric equivalent of simazine, in or on the commodity.*

A summary of the tolerance revisions and changes (e.g., to remove and/or establish new tolerances in accordance with new crop groups) that the Agency intends to require for simazine are listed in Table 1, below.

Table 1: Summary of Anticipated Tolerance Revisions for Simazine (40 CFR §180.213)

Commodity/ Correct Commodity Definition	Established Tolerance (ppm)	Required Tolerance (ppm)	Comments
Almond, hulls	0.25	3	Based on field trial data (D409212, W. Donovan, 26-JUN-2013)

Table 1: Summary of Anticipated Tolerance Revisions for Simazine (40 CFR §180.213)			
Commodity/ Correct Commodity Definition	**Established Tolerance (ppm)**	**Required Tolerance (ppm)**	**Comments**
Avocado	0.20	0.2	OECD rounding class consistency
Blackberry	0.20	0.2	
Blueberry	0.20	0.2	
Cattle, meat	0.03	Remove	Separate tolerances are not needed as these commodities fall under residue in livestock matrices 40 CFR §180.6(a)(3) 40 CFR §180.6(a)(3) D442822, W. Donovan, 12-JUN-2018
Cattle, meat byproducts	0.03	Remove	
Corn, field, forage	0.20	0.2	OECD rounding class consistency
Corn, field, grain	0.20	0.2	
Corn, pop, grain	0.20	0.2	
Corn, sweet, forage	0.20	0.2	
Corn, sweet, kernel plus cob with husks removed	0.25	0.2	D442825, W. Donovan, 10-JUL-2018 OECD rounding class consistency
Egg	0.03	Remove	Separate tolerances are not needed as these commodities fall under residue in livestock matrices 40 CFR §180.6(a)(3) 40 CFR §180.6(a)(3) D442822, W. Donovan, 12-JUN-2018
Goat, meat	0.03	Remove	
Goat, meat byproducts	0.03	Remove	
Fruit, citrus, group 10-10	-	0.04	Establishment of crop group tolerance
Grapefruit	0.25	Remove	
Lemon	0.25	Remove	
Orange	0.25	Remove	
Fruit, pome, group 11-10	-	0.03	Establishment of crop group tolerance
Apple	0.20	Remove	
Pear	0.25	Remove	
Fruit, stone, group 12-12	-	0.1	Establishment of crop group tolerance
Cherry	0.25	Remove	
Peach	0.20	Remove	
Plum	0.25	Remove	
Grape	0.20	0.2	OECD rounding class consistency
Horse, meat	0.03	Remove	Separate tolerances are not needed as these commodities fall under residue in livestock matrices 40 CFR §180.6(a)(3) 40 CFR §180.6(a)(3) D442822, W. Donovan, 12-JUN-2018
Horse, meat byproducts	0.03	Remove	
Loganberry	0.20	0.2	OECD rounding class consistency
Milk	0.03	Remove	Separate tolerances are not needed as these commodities fall under residue in livestock matrices 40 CFR §180.6(a)(3) 40 CFR §180.6(a)(3) D442822, W. Donovan, 12-JUN-2018
Nut, tree, group 14-12	-	0.05	Establishment of crop group tolerance
Almond	0.25	Remove	
Hazelnut	0.20	Remove	
Nut, macadamia	0.20	Remove	
Pecan	0.20	Remove	

Table 1: Summary of Anticipated Tolerance Revisions for Simazine (40 CFR §180.213)			
Commodity/ Correct Commodity Definition	**Established Tolerance (ppm)**	**Required Tolerance (ppm)**	**Comments**
Walnut	0.2	Remove	
Olive	0.20	0.2	OECD rounding class consistency
Raspberry	0.20	0.2	
Sheep, meat	0.03	Remove	Separate tolerances are not needed as these commodities fall under residue in livestock matrices 40 CFR §180.6(a)(3) 40 CFR §180.6(a)(3) D442822, W. Donovan, 12-JUN-2018
Sheep, meat byproducts	0.03	Remove	
Strawberry	0.25	0.03	Based on field trial data (D442825, W. Donovan, 10-JUL-2018)

4. Human Health Data Needs

The human health risk assessment identified multiresidue method testing results (OCSPP 860.1360) for the chlorinated metabolites of atrazine, propazine, and simazine (desethylatrazine (DEA), desisopropylatrazine (DIA), and diaminochlorotriazine (DACT)) as a data deficiency. These data are needed to determine the suitability of multiresidue methodology for quantification of simazine and its regulated metabolites. The Agency issued a GDCI to require these data on December 12, 2018. These data are under development and due to be submitted to the Agency by December 20, 2020. Pending review and acceptability of this study, the Agency does not anticipate any further human health data needs for the simazine registration review.

The Agency is moving forward with its registration review decision because this required multiresidue study is needed for greater efficiency of tolerance enforcement and does not impact the safety finding for simazine.

B. Ecological Risks

A summary of the Agency's ecological risk assessment is presented below. The Agency used the most current science policies and risk assessment methodologies to prepare a risk assessment in support of the registration review of simazine. For additional details on the ecological assessment for simazine, see the *Preliminary Ecological Risk Assessment for Simazine*, which is available in the public docket.

EPA is currently working with its federal partners and other stakeholders to implement an interim approach for assessing potential risk to listed species and their designated critical habitats. Once the scientific methods necessary to complete risk assessments for listed species and their designated critical habitats are finalized, the Agency will complete its endangered species assessment for simazine. See Appendix C for more details. As such, potential risks for non-listed species only are described below.

1. Risk Summary and Characterization

EPA estimated risks associated with simazine use to non-target birds, mammals, reptiles, freshwater fish, amphibians, and aquatic invertebrates; terrestrial invertebrates, including honeybees and other insect pollinators; and plants. Risk estimates (risk quotients, or RQs) were compared with EPA's LOCs. For ecological risk, RQs below the LOC are not of concern to the Agency. For all taxa in the terrestrial assessment, except for plants, the LOC for acute exposure is 0.5 and the LOC for chronic exposure is 1.0. The LOC for plants is 1.0. In the draft risk assessment, the Agency identified potential chronic risk concerns for mammals, birds, freshwater fish, amphibians, reptiles, and aquatic invertebrates. In addition, available information suggests potential risk to terrestrial invertebrates. The draft risk assessment assessed the maximum-labelled and typical application rates.

Terrestrial Risks

Mammals

The ecological risk assessment did not identify acute risks of concern for mammals; however, chronic risk estimates exceed the Agency's LOC of 1 for all uses. At maximum application rates, chronic risk quotients (RQs) range from 1 - 869. The toxicity endpoint is based on decreased body weight and body weight gains. In addition, chronic LOCs for mammals are exceeded up to distances of 1,000 feet off field depending on the method of application and application rate.

Birds, Reptiles, and Terrestrial-Phase Amphibians

The ecological risk assessment did not identify acute risks of concern for birds; however, chronic levels of concern (LOC = 1) are exceeded for birds for all simazine uses. Birds serve as surrogates for reptiles and terrestrial-phase amphibians in the absence of taxa-specific data. Chronic RQs range from 0.2 to 11.2. The chronic endpoint is based on reproduction impacts observed in the most sensitive species, bobwhite quail.

Terrestrial Invertebrates (honeybees)

Available toxicity data indicate that simazine is practically non-toxic to bees on an acute oral exposure basis. Based on these data, the Agency calculated an RQ of 0.11, which is below the Agency's LOC of 0.4 for acute exposure. However, there is uncertainty about potential risks to terrestrial invertebrates because a full Tier 1 suite of terrestrial invertebrate toxicity studies is not available at this time.

Although the EPA identified the need for certain data to evaluate potential ecological effects to non-target organisms when initially scoping the registration review for propazine, the ecological effects problem formulation and the May 2014 registration review DCI were both issued prior to the EPA's issuance of the June 2014 *Guidance for Assessing Pesticide Risks to Bees*[2]. EPA is

[2] Available at https://www.epa.gov/sites/production/files/2014-06/documents/pollinator_risk_assessment_guidance_06_19_14.pdf

currently determining whether additional pollinator data are needed for simazine. If the Agency determines that additional pollinator exposure and effects data are necessary to help make a final registration review decision for simazine, then EPA will issue a DCI to obtain these data. The pollinator studies that could be required are listed in Table 1 below and based on EPA's June 2014 *Guidance for Assessing Pesticide Risks to Bees*[3].

Table 1: Potential Pollinator Data Requirements	
Guideline #	**Study**
Tier 1	
850.3020	Acute contact toxicity study with adult honey bees
850.3030	Honey bee toxicity of residues on foliage
Non-Guideline (OECD 213)	Honey bee adult acute oral toxicity
Non-Guideline (OECD 237)	Honey bee larvae acute oral toxicity
Non-Guideline	Honey bee adult chronic oral toxicity
Non-Guideline	Honey bee larvae chronic oral toxicity
Tier 2†	
Non-Guideline	Field trial of residues in pollen and nectar
Non-Guideline (OECD 75)	Semi-field testing for pollinators
Tier 3†	
850.3040	Full-Field testing for pollinators

† The need for higher tier tests for pollinators will be determined based upon the results of lower tiered tests and/or other lines of evidence and the need for a refined pollinator risk assessment.

Terrestrial Plants

Consistent with its herbicidal mode of action, simazine is highly toxic to monocot and dicot terrestrial plant species. As such, non-target terrestrial plant species in areas adjacent to treated fields are likely to be impacted by exposure to simazine. At the maximum single application rate, RQs associated with exposure via spray drift, as well as the combination of runoff and spray drift exposure to dry areas and semi-aquatic habitats exceed the LOC of 1. RQs for spray drift-only exposure range from 0.5 to 8.9, RQs for runoff and spray drift deposition to dry areas range from 1.0 to 10.7, and RQs for runoff and spray drift deposition to semi-aquatic areas range from 5.5 to 48.9. The adverse effect endpoint is based on impacts to seedling emergence.

For characterization, EPA evaluated potential risks to terrestrial plants at reduced application rates and developed species vegetative vigor and seedling emergence sensitivity distributions (SSDs); however, risks to terrestrial plants remain of concern.

Aquatic Risks

Freshwater Fish and Aquatic-Phase Amphibians

EPA's chronic LOC of 1 is exceeded for freshwater fish and aquatic-phase amphibians through runoff and spray drift deposition into waterways following labeled applications for many simazine uses (including corn, orchard, and berries), with RQs ranging from 0.1 to 5.7. The

[3] Available at https://www.epa.gov/sites/production/files/2014-06/documents/pollinator_risk_assessment_guidance_06_19_14.pdf

chronic fish endpoint is based on decreased egg production in the freshwater Japanese medaka fish; this endpoint is from a study conducted with atrazine, as no such study is available for simazine. With aquatic-phase amphibian data unavailable, freshwater fish data is considered as surrogate data for aquatic phase amphibians, and therefore chronic risks to aquatic-phase amphibians are the same as freshwater fish. While there are amphibian-specific data for atrazine which indicate potential sublethal effects at low exposure concentrations, it is unclear to what degree those data represent simazine.

Estuarine/Marine Fish
Acute and chronic RQs did not exceed the LOC for estuarine/marine fish.

Freshwater Invertebrates
The ecological risk assessment did not identify acute risks of concern for freshwater invertebrates; however, chronic risk estimates exceed the Agency's LOC of 1, with RQs ranging from 0.2 to 9.

Estuarine/Marine Invertebrates
The ecological risk assessment did not identify acute risks of concern for estuarine/marine invertebrates; however, chronic risk estimates exceed the Agency's LOC of 1 for estuarine/marine invertebrates, with RQs ranging from 0.1 to 5.7.

Aquatic Vascular and Non-Vascular Plants
Risk estimates exceed the Agency's LOC for aquatic vascular and non-vascular plants for nearly all uses. RQs range from 0.8 – 46.4 for vascular plants, and 0.1 – 5.5 for non-vascular plants.

Aquatic Plant Communities
Simazine does not have an extensive body of research on micro and mesocosms like atrazine does. However, because atrazine and simazine share a common mechanism of action and similar potency in plants and coupled with their propensity to move into aquatic ecosystems and their persistence in water, these chemicals both pose a potential risk to aquatic plant communities. Based on the toxicity data, there are risks to non-vascular plants for all simazine uses and risks to vascular plants for many uses.

2. Ecological Incidents

A review of the Ecological Incident Information Systems (EIIS) database for ecological incidents involving simazine was completed on August 2020. The Avian Monitoring System (AIMS) is a database administered by the American Bird Conservancy and are included in the EIIS summary. The EIIS search resulted in three incidents involving terrestrial animals, four for plants, and ten freshwater incidents involving fish kills.

The Aggregate Incident Summary report in the IDS shows six simazine related incidents, including two involving plant damage and the others were single reports involving moderate property damage, minor to moderate effects on domestic animals, fatal domestic animal event and one unspecified human event.

The Agency will continue to monitor ecological incident information as it is reported to the Agency. Detailed analyses of these incidents are conducted if reported information indicates concerns for risk to non-target organisms.

C. Benefits Assessment

Simazine is a chlorinated triazine herbicide and is classified as a Weed Science Society of America (WSSA) Group 5 herbicide. Simazine is applied before the weed emerges to control broadleaf and grass weeds, and it can be applied in the fall for winter weed control. Simazine is a commonly used preemergence, soil residual herbicide in orchards, vineyard, berry crops, nurseries/ornamentals, and Christmas tree farms. There is also usage of simazine in non-agricultural sites, including turfgrass and forestry sites. It is an important herbicide for these use sites because it is economical, has a flexible use pattern, has a long residual period, has good crop safety, and is highly effective against a broad spectrum of weeds.

Field Corn

In field corn, simazine provides residual control and offers control of a broad-spectrum of broadleaf weeds and grasses. It has a flexible use pattern in that it can be applied before planting, before crop emergence, or as a fall application after harvest. The Corn Belt states (Illinois, Indiana, Iowa, Missouri, Ohio) account for approximately 76% of simazine's total acre treatments, followed by the Southern/Seaboard states (Kentucky, Maryland, North Carolina, Virginia) with about 18% of total area treatments and Northeast/Lakes states (Delaware, Michigan, Pennsylvania, Wisconsin) with about 7% of total acre treatments. Application timing varies by region, but nationally about 48% of simazine is applied during the previous fall (after the harvest primarily in the Corn Belt for winter weed control), and the remaining 52% is applied before corn emerges. In the absence of simazine, in the Corn Belt and Northeast/Lakes states, EPA estimates a loss of approximately 4% in net revenue ($7 per acre) for applications made prior to crop emergence using the next best alternative herbicide. For the Southern/Seaboard states, EPA estimates that growers may choose to use atrazine in the absence of simazine, which is slightly cheaper than simazine per acre, so no net revenue losses are expected.

For more information refer to *Atrazine and Simazine Use on Field Corn: Response to comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)* in the docket.

Orchards, Vineyards, Berries and Christmas Trees

In perennial crop settings such as orchards, vineyards, and berries, simazine is used for residual control of grasses and broadleaf weeds that occur in row middles and around the base of crops or trees. Simazine is typically applied in the late fall or early spring months to provide weed control in perennial cropping systems. It is the top pre-emergent option used in caneberry production. In strawberries, simazine may be important for operations that do not use fumigation or for residual control after harvest, especially in the Pacific Northwest strawberry production areas. In

Christmas tree production, simazine is a preemergence herbicide that can provide residual control with winter applications.

For more information refer to *Simazine Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation on Orchards, Vineyards, Caneberries, Strawberries, and Christmas Trees; PC Code (080807)* in the docket.

Sweet Corn

Simazine provides residual control and offers control of a broad-spectrum of broadleaf weeds and grasses in sweet corn. It has a flexible use pattern in that it can be applied before planting, at plant, before crop emergence or as a fall application after harvest. Growers in the North Central / Northeastern (Indiana, Illinois, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Wisconsin) region account for nearly all of the simazine usage in sweet corn, even though simazine is recommended by university extension in other regions. Without simazine, the Agency estimates an increase in production costs of $11 per acre in the North Central / Northeastern region using the next best alternative herbicide. Simazine is more expensive than atrazine and used less frequently; however, it is still less expensive than many other herbicides that can be used to target the similar suite of broadleaf weeds and grasses.
For more information refer to *Atrazine and Simazine Use on Sweet Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)* in the docket.

Turfgrass and Nursery/Ornamental

Simazine is a top preemergence herbicide for a few non-agricultural use sites (i.e., certain types of turfgrass and nursery/ornamental sites). Herbicides are applied to turfgrass at golf courses, homes, parks, and professionally maintained turfgrass sites to control annual broadleaf and grass weeds which may impact yield and/or seed/turf quality, playability, or it may be primarily driven by aesthetics. According to the most recent data (2013) available to the Agency, simazine was the third most used preemergence herbicide on turf-sod farms, and the second most used preemergence herbicide on golf courses in terms of pounds applied. Simazine can be used on many ornamental species without causing damage to the species. Simazine was the second-most used herbicide overall in nursery/ornamental sites in 2013.

For more information refer to *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits; PC Codes (080803 and 080807)* in the docket.

IV. INTERIM REGISTRATION REVIEW DECISION

A. Risk Mitigation and Regulatory Rationale

The currently registered uses of simazine pose potential human health risks of concern, including residential post-application, aggregate, and cumulative risk associated with simazine use on residential turf and potential occupational risk to handlers from mixing, loading, and applying

simazine. In addition, simazine use poses potential ecological risks to mammals, birds, reptiles, amphibians, fish, aquatic invertebrates, terrestrial plants and aquatic plant communities.

The Agency has reviewed the risks, benefits, and uses of simazine and has determined that risk mitigation is necessary. For information about the potential impacts of the necessary mitigation, please refer to Section IV. C. *Expected Impacts of Necessary Mitigation*.

EPA is describing the mitigation measures that are necessary to address the identified potential risks of concern and subsequently discusses the expected impacts by use site (unless otherwise noted). By describing the mitigation in this way, the Agency seeks to clarify the specific mitigation that may impact each specific simazine user group.

To address the potential residential post-application, aggregate, and cumulative risk concerns for simazine use on residential turf, EPA determined that it is necessary to reduce the maximum application rate to either 0.65 lb ai/A or a maximum application rate of 1.6 lb ai/A with required irrigation of 0.5 inches of water immediately following application to turf. (The application rate is being reduced from 2.0 lbs ai/A.) This provides users flexibility to either irrigate and use simazine at 1.6 lb ai/A or use simazine as part of a tank- or pre-mix at a reduced rate (0.65 lbs ai/A) without irrigation. In addition, EPA determined that additional PPE or engineering controls are necessary to address potential occupational handler risk concerns associated with various simazine uses, as discussed in more detail below. EPA also determined that updates to the spray drift reduction language are necessary for all labels. Additionally, updates to herbicide resistance management language and some additional label updates for consistency with generic labeling requirements are necessary.

In evaluating potential risk mitigation for simazine, EPA considered the risks, the benefits, and the use pattern. Although there are potential risks of concern associated with the use of simazine, with the adoption of the mitigation measures discussed in this section, EPA determined that any remaining potential worker and/or ecological risks are outweighed by the benefits associated with use of simazine (i.e., important herbicide for warm-season grass crops including corn, sorghum, and sugarcane; it is economical; has a flexible use pattern; has a long residual period; good crop safety; and is highly effective against a broad spectrum of weeds. There are also similar benefits of simazine in non-agricultural sites such as, turfgrass and nurseries/ornamentals).

1. Requiring Reduced Application Rate and Irrigation for Residential Turf

As discussed in *Section I A. Updates Since the Proposed Interim Registration Review Decision was Issued*, the human health risk assessment indicates potential post-application, aggregate, and cumulative triazine risks of concern for adults from dermal exposures to treated residential turf and children 1 to <2 years old from combined dermal and incidental oral exposures to treated residential turf. In the PID, the Agency proposed to cancel the resident turf use. Based on comments received on the PID from the registrants, the Agency is now allowing two alternative mitigation options to address this risk. The Agency determined that reducing the application rate to 1.6 lb ai/A coupled with a requirement for irrigation with 0.5 inches of water immediately following application to turf, or a lower maximum application rate of 0.65 lb ai/A without the

requirement for irrigation, will address these risks of concern (i.e., with the mitigation, the resultant MOEs are above the level of concern of 30). EPA determined that all labels with residential and recreational turf use, including turf around homes, daycare facilities, schools, playgrounds, parks, recreational areas, or sports fields, need to include one or both of these label restrictions to address the risk of concern. EPA expects these measures to be updated on labeling in a timely manner. Use on golf courses and sod-production fields does not require this mitigation; simazine use on golf courses and sod-production fields may continue to be labeled up to the current maximum application rate of 2 lb ai/A.

For information about the impacts of the necessary mitigation, please refer to Section IV.C, *Impacts of Mitigation* of the simazine ID.

2. Risk Mitigation for Occupational Handlers

The human health risk assessment identifies several scenarios that result in potential risks of concern to occupational handlers who mix, load, and apply simazine. EPA determined that additional PPE is necessary to address these potential risks, including a respirator in some cases and, for pesticides covered by the Worker Protection Standard[4] (WPS), the associated fit test, training, and medical evaluation:

- To address potential risks of concern to occupational handlers, EPA determined coveralls over long sleeve shirts and long pants are necessary for the uses listed below.
    - Dry flowable and Water Dispersible Granule (DF/WDG) – backpack application – grapefruit, oranges
    - Liquid – backpack application – grapefruit, oranges
- To address potential risks of concern to occupational handlers, EPA determined that either additional PPE of coveralls over long sleeve shirts and long pants is needed or labels need to be amended to restrict application to spot treatment only for the uses listed below. Either mitigation measure will bring the MOEs to above the LOC and remove any potential risks of concern.
    - DF/WDG – mechanically pressurized handgun – strawberries
    - Liquid – mechanically pressurized handgun – strawberries
- To address potential risks of concern to occupational handlers, EPA determined that labels need to be amended to restrict mechanically pressurized handgun applications of DF, WDG, and liquid formulations of simazine to spot treatment only for the following uses.
    - Citrus (Grapefruit, Oranges, Lemons)
    - Pome Fruits (Apples, Pears)
    - Stone Fruits (Cherries [sweet and tart], peaches, Plums, Nectarines)
    - Tree Nuts (Pecans, Walnuts, Filberts, Almonds, Macadamia Nuts
    - Berry and Small Fruit (Blueberries, Blackberries, Loganberries, Raspberries, Grapes, Lowbush Blueberries, Cranberries)
    - Tropical and Sub-tropical Fruits (Avocado, Olive)
    - Nursery/Ornamentals
    - Sweet corn

[4] 40 CFR 170

For information about the impacts of the necessary mitigation, please refer to Section IV.C, *Expected Impacts of the Necessary Mitigation*.

3. Spray Drift Reduction Language

In the 2006 Reregistration Eligibility Decision for Simazine (RED), mandatory and advisory spray drift language was specified. EPA determined that updates to existing spray drift mitigation label language on all simazine products labeled for liquid spray application are necessary. These additional restrictions include mandatory, enforceable statements that will supersede any existing language already on product labels (either advisory or mandatory) covering the same topics. When requesting labeling amendments to add these new statements, registrants must ensure that any advisory language left on labels does not contradict or modify the new mandatory spray drift statements required in this ID, once effective.

- Applicators must not spray during temperature inversions.
- For ground boom applications, apply with the release height no more than 4 feet above the ground or crop canopy.
- For ground applications, do not apply when wind speeds exceed 10 mph at the application site.
- For ground applications, select nozzle and pressure that deliver coarse or coarser droplets as indicated in nozzle manufacturers' catalogues and in accordance with American Society of Agricultural & Biological Engineers Standard 572.1 (ASABE S572).

In addition to including the spray drift restrictions on simazine labels, all references to volumetric mean diameter (VMD) information for spray droplets need to be removed from all simazine labels where such information currently appears. The required new language above, which cites ASABE S572, eliminates the need for VMD information.

4. Non-target Organism Advisory Statement

EPA determined that a non-target organism advisory is necessary label language for simazine. The protection of pollinating organisms is a priority for the Agency. Simazine may negatively impact forage and habitat of pollinators and other non-target organisms. It is the Agency's goal to reduce spray drift whenever possible and to educate growers on the potential for indirect effects on the forage and habitat of pollinators and other non-target organisms. Therefore, EPA determined that a non-target organism advisory language is necessary on simazine labels to address this potential concern.

For information about the impacts of the necessary mitigation, please refer to Section IV.C, *Expected Impacts of the Necessary Mitigation*.

5. Herbicide Resistance Management

On August 24, 2017, EPA finalized a Pesticide Registration Notice (PRN) on herbicide resistance management.[5] Consistent with the Notice, EPA has determined that the implementation of herbicide resistance measures for existing chemicals during registration review is necessary. In registration review, herbicide resistance elements will be considered and addressed in every herbicide PID.

The development and spread of herbicide resistant weeds in agriculture is a widespread problem that has the potential to fundamentally change production practices in U.S. agriculture. While herbicide resistant weeds have been known since the 1950s, the number of species and their geographical extent, has been increasing rapidly. Currently there are over 250 weed species worldwide with confirmed herbicide resistance. In the United States, there are over 155 weed species with confirmed resistance to one or more herbicides.

Management of herbicide resistant weeds, both in mitigating established herbicide resistant weeds and in slowing or preventing the development of new herbicide resistant weeds, is a complex problem without a simple solution. Coordinated efforts of growers, agricultural extension, academic researchers, scientific societies, pesticide registrants, and state and federal agencies are required to address this problem.

EPA determined that labeling statements are necessary to provide growers and users with detailed information and recommendations to slow the development and spread of herbicide resistant weeds. This is part of a more holistic, proactive approach recommended by crop consultants, commodity organizations, professional/scientific societies, researchers, and the registrants themselves.

6. Additional Label Changes

In addition to the above-mentioned mitigation measures, EPA has also determined that the following label changes are necessary to address generic labeling requirements for all simazine products and uses:

- *Updated Glove and Respirator Label Language*: The Agency has determined that an update to the glove and respirator statements currently on labels is necessary to be consistent with the Label Review Manual[6]. The new glove and respirator language do not fundamentally change the personal protective equipment that workers need to use, and therefore should impose no impacts on users. For gloves, all statements that refer to the chemical resistance category selection chart must be removed from simazine labels as they might cause confusion for users. These statements must be replaced with specific chemical-resistant glove types, as appropriate. See Appendix B.
- *Directions for Mixing/Loading Water Soluble Packages (WPS) Label Language*: see Appendix B.

[5] PRN 2017-2, "Guidance for Herbicide Resistance Management Labeling, Education, Training, and Stewardship". Available at https://www.epa.gov/pesticide-registration/pesticide-registration-notices-year
[6] https://www.epa.gov/pesticide-registration/label-review-manual

B. Status of Simazine Water Monitoring Program and Future Changes

A drinking water monitoring program was required through a 2008 simazine Generic Data Call-In (GDCI-080807-26466) (2008) and identified as being needed in the Simazine RED (2006). The simazine drinking water monitoring program, which is conducted in conjunction with a similar monitoring program for atrazine, monitors community drinking water systems, primarily in the midwest United States in areas of high simazine use, to assesses simazine levels in drinking water sources.

EPA recognizes that the totality of available triazine monitoring data, including data collected through the simazine drinking water monitoring program, is robust and comprehensive. The availability of robust triazine monitoring data enabled EPA to refine and characterize its draft human health risk assessments. While having monitoring data specific to community water systems is useful, given the conclusions of the 2018 draft triazine human health risk assessments, EPA is discontinuing the requirement for simazine drinking water monitoring. Model-estimated triazine concentrations, as well as measured concentrations for community water systems are well below the drinking water level of concern (DWLOC). The vast majority of samples from the simazine monitoring program were below 1 ppb, while the highest triazine concentration ever measured was 227 ppb, which is well below the triazine DWLOC of 580 ppb. Therefore, the Agency does not see value in continuation of the simazine drinking water monitoring program. For these reasons, EPA suspended the requirement for the simazine drinking water monitoring program for calendar year 2020 during which time the Agency solicited comments (during the 60-day comment period for the PID) about the proposal to end the requirement for the simazine drinking water program. The Agency did not receive significant comments that illustrated a continued need for monitoring through this program and therefore the Agency will no longer require the simazine drinking water monitoring program.

C. Expected Impacts of the Necessary Mitigation

The expected impacts of the necessary mitigation are presented below by use site unless otherwise noted. The intent is to help clarify to which situations specific mitigation applies and for each user group to determine how they will be impacted by all necessary mitigation. For more information, see the following documents which are located in the docket: *Atrazine and Simazine Use on Field Corn: Response to comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807), Simazine Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation on Orchards, Vineyards, Caneberries, Strawberries, and Christmas Trees; PC Code (080807),* and *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits; PC Codes (080803 and 080807)*.

<u>Impact of Spray Drift Reduction Language Update</u>
The Agency recognizes that the 2006 Reregistration Eligibility Decision for Simazine (RED) specified mandatory spray drift language; however, not all components of that language were incorporated on all product labels, including frequently used products. Therefore, the Agency is evaluating the impacts of each component of the spray drift language update.

Impacts of Inversion Restriction

This requirement could reduce the amount of time users have to apply triazines. Users may switch to other products that only have advisory language for this restriction if they encounter temperature inversions when needing to treat a field.

Impacts of Mandatory Maximum Spray Release Height Requirement for Ground Applications

For ground boom applications, apply with the release height no more than 4 feet above the ground or crop canopy. This currently exists as mandatory label language; therefore, there will be no impact.

Impacts of Windspeed Restrictions for Ground Applications

The Agency is aware that low wind speeds reduce the number of available hours a grower would have to make an application. However, a restriction of 10 miles per hour for ground applications currently exists as mandatory label language; therefore, there will be no impact.

Impacts of Droplet Size

The Agency is ensuring that a restriction on droplet size is specified as mandatory label language because coarser or coarser droplets have been demonstrated to decrease spray drift, and therefore, reduce potential risks to non-target species. The current droplet size language specified in the simazine RED is advisory; through registration review, the Agency has determined that adjusting the language to clarify droplet size restrictions are mandatory is necessary.

Because chemical-specific data for the performance of droplet sizes is limited, EPA is not able to evaluate the effects of medium or coarser droplet sizes (as defined by ASABE S572.1) specifically for simazine. Therefore, EPA does not know the effect this mitigation measure will have on the performance of simazine across various use patterns, especially regarding tank mix partners that require a finer droplet size. In general, potential negative impacts to growers from requiring larger droplets could include: reductions in efficacy, increased selection pressure for the evolution of herbicide resistance due to a decrease in lethal dose delivered to target weeds, increased application rates used by growers, increased costs associated with reduced yield, additional herbicide applications, purchase of alternative products, or an inability to use tank mix or premix products.

Impacts of Interaction of Individual Components of Spray Drift Mitigation

The Agency acknowledges the impacts of multiple mitigation measures could be compounded and further reduce the time in which applicators could apply herbicides. For instance, applicators may deal with wind restrictions by spraying early in the morning/late evenings when winds are calmer; however, temperature inversions are more likely to occur several hours before sunset and can persist until 1-2 hours after sunrise. As the window of application gets smaller, growers may be forced to switch to products without these restriction on short notice. Therefore, the alternative may be based on availability and not cost and/or performance, which could be costly and reduce weed control. Additionally, growers may have situations where a tank is loaded and ready to spray, but they are not able to spray due to prolonged weather conditions that prevent application due mandatory multi-layered restrictions. In rare situations, there could be scenarios

where applicators cannot spray what is mixed in the tank for a long period of time and would need to dispose of a large quantity of mixed herbicides in order to switch to an alternative mixture. There may be additional concerns (e.g., tank clean-out when products settle out) when a loaded tank sits hours, and possibly days.

Impacts of Mitigation by Use Site

Turfgrass
Post Application Irrigation plus reduced rate for Residential and Recreational Turfgrass, or Lower Reduced Rate for Residential and Recreational Turfgrass
The Agency considered the impacts of reducing the residential/recreational turfgrass maximum single application rate from the currently registered 2.0lbs ai/acre to 1.6 lbs ai/acre followed by mandatory irrigation (watering-in) of 0.5 inches of water (when rates are higher than 0.65 lbs. ai/acre); or allowing applications to occur without watering-in simazine, if rates are equal to or less than 0.65 lbs ai/acre (i.e., reduce the maximum application from 2.0lbs ai/acre to 0.65 lbs ai/acre without the irrigation requirement). The Agency concluded a lower application rate (0.65 lbs ai/acre) without the irrigation requirement allows flexibility for tank mix and premix options for weed control. The Agency also considers watering-in at an application rate higher than 0.65 lbs. ai/acre (but not to exceed 1.6 lbs ai/acre) feasible for many use sites.

Either watering-in at the higher rates (not to exceed 1.6 lbs ai/acre) or using the lower rate (of 0.65 lbs ai/A) with another herbicide(s) could add to the cost of weed control. The mitigation measures could impact some users with heavy weed pressure, and they would need to add an additional herbicide to the mixture or choose another herbicide to control their weeds; however, these impacts would be much less than cancellation of simazine use in turf which was initially proposed in the simazine PID.

Impacts of Inversion Restriction
This component does not appear on all labels. However, the Agency assumes that applications to golf course would be made during normal work hours when temperature inversions are unlikely. Therefore, the Agency assumes that requiring that applications be made when temperature inversions were not likely to occur would not impact golf course and recreational uses. For sod-production fields, there could be a reduction in hours when applications could be made (impacts of the spray drift mitigation, see above).

For more information refer to *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits* in the docket.

Field Corn
Spray Drift Management
For impacts of the spray drift mitigation, see above.

For more information refer to *Atrazine and Simazine Use on Field Corn: Response to comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)* in the docket.

Sweet Corn

Restrict Mechanically Pressurized Handgun Applications of DF/WDG/L Formulations to Spot Treatments Only

The Agency anticipates that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in sweet corn. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole) or the perimeter of a field (e.g., fencerows). Therefore, the impact of limiting mechanically pressurized applications to spot treatments is likely to be low in terms of acres impacted. However, if there are growers who use mechanically pressurized handguns for broadcast applications of simazine, they would have to make an application using a different herbicide, which may be more expensive and possibly less effective.

Spray Drift Management

For impacts of the spray drift mitigation measure, see above.

For more information refer to *Atrazine and Simazine Use on Sweet Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)* in the docket.

Citrus (Grapefruit, Oranges, Lemons)

Double-layers and Gloves for Grapefruit and Oranges for DF/WDG/L Formulations Applied via Backpack Sprayers

Requiring double-layer coveralls and gloves for users applying via backpack will not likely impact the overall use of simazine since it is likely that applications via backpack sprayers are infrequent. However, users who apply with backpack equipment may incur some additional costs or burdens. For example, the use of PPE (e.g., wearing double layers when applying pesticides) can reduce productivity of workers because of the physiological stress when working in high temperatures and/or humid conditions. Workers may need to take more frequent breaks in certain situations than if extra PPE were not required. Individuals will respond differently depending on many factors, such as fitness level, hydration, acclimatization, etc. The requirement of additional PPE when individuals are applying simazine with a backpack applicator could decrease productivity, which will increase the time required for an application to be made, and likely increase costs. Alternatively, applicators may choose to use a different herbicide, which could be more expensive and potentially less effective than simazine.

Restrict Mechanically Pressurized Handgun Applications of DF/WDG/L Formulations to Spot Treatments Only (Grapefruit, Oranges, Lemons)

The Agency assumes that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in citrus groves. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole) or the perimeter of a field (e.g., fencerows). Therefore, limiting mechanically pressurized applications to spot treatments is likely to be low in terms of acres impacted. However, if there are growers who use mechanically pressurized handguns for broadcast applications of simazine, they would have to make an application using a different herbicide, which may be more expensive and possibly less effective.

Spray Drift Management
For impacts of the spray drift mitigation measures to Grapefruit, Oranges, and Lemons, see above.

Pome Fruits (Apples, Pears)
Restrict Mechanically Pressurized Handgun Applications of DF/WDG/L Formulations to Spot Treatments Only
The Agency assumes that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in in orchards. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole) or the perimeter of a field (e.g., fencerows). Therefore, limiting mechanically pressurized applications to spot treatments is likely to be low in terms of acres impacted. However, if there are growers who use mechanically pressurized handguns for broadcast applications of simazine, they would have to make an application using a different herbicide, which may be more expensive and possibly less effective.
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Spray Drift Management
For impacts of the spray drift mitigation measures for Pome fruit, see above.

Stone Fruits (Cherries [sweet and tart], Peaches, Plums, Nectarines)
Restrict Mechanically Pressurized Handgun Applications of DF/WDG/L Formulations to Spot Treatments Only
The Agency assumes that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in orchards. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole) or the perimeter of a field (e.g., fencerows). Therefore, limiting mechanically pressurized applications to spot treatments is likely to be low in terms of acres impacted. However, if there are growers who use mechanically pressurized handguns for broadcast applications of simazine, they would have to make an application using a different herbicide, which may be more expensive and possibly less effective.
Spray Drift Management
For impacts of the spray drift mitigation measures to Stone Fruit, see above.

Tree Nuts (Pecans, Walnuts, Filberts, Almonds, Macadamia Nuts)
Restrict Mechanically Pressurized Handgun Applications of DF/WDG/L Formulations to Spot Treatments Only
The Agency assumes that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in orchards. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole) or the perimeter of a field (e.g., fencerows). Therefore, limiting mechanically pressurized applications to spot treatments is likely to be low in terms of acres impacted. However, if there are growers who use mechanically pressurized handguns for broadcast applications of simazine, they would have to make an application using a different herbicide, which may be more expensive and possibly less effective.

Spray Drift Management
For impacts of the spray drift mitigation measures to Tree Nuts, see above.

Berry and Small Fruit (Blueberries, Blackberries, Loganberries, Raspberries, Grapes, Lowbush Blueberries, Strawberries, Cranberries)
Double-layers and Gloves for DF/WDG/L Formulations Applied Via Mechanically Pressurized Handguns (Strawberries)
Requiring double-layer coveralls and gloves for users applying via mechanically pressurized handguns will not likely impact the overall use of since it is likely that applications via mechanically pressurized handguns are infrequent. However, users who apply with mechanically pressurized handguns, may incur some additional costs or burdens. For example, the use of a PPE (e.g., wearing double layers when applying pesticides) can reduce productivity of workers because of the physiological stress when working in high temperatures and/or humid conditions. Workers may need to take more frequent breaks in certain situations than if extra PPE were not required. Individuals will respond differently depending on many factors, such as fitness level, hydration, acclimatization, etc. Alternatively, applicators may choose to use a different herbicide, which could be more expensive and potentially less effective than simazine.

Restrict Mechanically Pressurized Handgun Applications of DF/WDG/L Formulations to Spot Treatments Only (Blueberries, Blackberries, Loganberries, Raspberries, Grapes, Lowbush Blueberries, Cranberries)
The Agency assumes that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in orchards. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole) or the perimeter of a field (e.g., fencerows). Therefore, limiting mechanically pressurized applications to spot treatments is likely to be low in terms of acres impacted. However, if there are growers who use mechanically pressurized handguns for broadcast applications of simazine, they would have to make an application using a different herbicide, which may be more expensive and possibly less effective.

Spray Drift Management
For impacts of the spray drift mitigation measures to Berries and Small Fruit, see above.

Tropical and Sub-tropical Fruits (Avocado, Olive)
Restrict Mechanically Pressurized Handgun Applications of DF/WDG/L Formulations to Spot Treatments Only
The Agency assumes that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in orchards. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole) or the perimeter of a field (e.g., fencerows). Therefore, limiting mechanically pressurized applications to spot treatments is likely to be low in terms of acres impacted. However, if there are growers who use mechanically pressurized handguns for broadcast applications of simazine, they would have to make an application using a different herbicide, which may be more expensive and possibly less effective.

Spray Drift Management
For impacts of the spray drift mitigation measures to Avocado and Olives, see above.

For more information refer to *Simazine Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation on Orchards, Vineyards, Caneberries, Strawberries, and Christmas Trees* in the docket.

Nursery and Ornamentals
Restrict Mechanically Pressurized Handgun Applications of DF/WDG/L Formulations to Spot Treatments Only
The Agency assumes that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in nursery and ornamental operations. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole), the perimeter of a field (e.g., fencerows), or for small groups of nursery or ornamental crops in small acreage sites. Therefore, limiting mechanically pressurized applications to spot treatments is likely to be low in terms of acres impacted. However, if there are growers who use mechanically pressurized handguns for broadcast applications of simazine, they would have to make an application using a different herbicide, which may be more expensive and possibly less effective.
Spray Drift Management
Nursery and ornamental users generally have mixtures of many plant species and are therefore careful about off-site movement. Therefore, impacts of the spray drift mitigation measures relevant to maximum droplet size, boom height, and maximum windspeed should be minimal, see above.

For more information refer to *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits.* in the docket.

D. Tolerance Actions

EPA is requiring the establishment and revocation, as well as amendment of tolerances for several commodities. Refer to Section III.A.3 for details. The Agency will use its FFDCA rulemaking authority to make the needed changes to the tolerances.

E. Interim Registration Review Decision

In accordance with 40 CFR §§ 155.56 and 155.58, the Agency is issuing this ID. Except for the Endocrine Disruptor Screening Program (EDSP), and the Endangered Species Act (ESA) components of this case, the Agency has made the following ID: (1) with the exception of the outstanding GDCI data requirements, no additional data are required at this time; and (2) changes to the affected registrations and their labeling are needed at this time, as described in Section IV.A and Appendices A and B.

In this ID, the Agency is making no human health or environmental safety findings associated with the EDSP screening of simazine, nor is it making a final endangered species finding. Although the Agency is not making a final endangered species finding at this time, the required

mitigation described in this document, when implemented on labels, is expected to reduce the extent of environmental exposure and may reduce risk to listed species whose range and/or critical habitat co-occur with the use of simazine. The Agency's final registration review decision for simazine will be dependent upon the result of the Agency's ESA assessment and any needed § 7 consultation with the Services, and an EDSP FFDCA § 408(p) determination.

F. Data Requirements

EPA issued a GDCI requiring multiresidue method testing results (OCSPP 860.1360) for simazine and its chlorinated metabolites, desisopropylatrazine (DIA), and diaminochlorotriazine (DACT) on December 12, 2018. These data are needed to determine the suitability of multiresidue methodology for quantification of simazine and its regulated metabolites. resulting in more efficient residue testing for tolerance enforcement. However, they are not needed to make a safety finding and will not impact the interim decision. These data are under development and are required to be submitted to the Agency by December 20, 2020.

No additional data are anticipated to be needed to be called-in for this registration review at this time. The EPA will consider requiring submission of pollinator data as a separate action.

The analytical reference standard for desisopropylatrazine (DIA), and diaminochlorotriazine (DACT) have expired and must be submitted to EPA's National Pesticide Standards Repository (see https://www.epa.gov/pesticide-analytical-methods/national-pesticide-standard-repository).

V. NEXT STEPS AND TIMELINE

A. Interim Registration Review Decision

A Federal Register Notice will announce the availability of this Interim Registration Review Decision for simazine. A final decision on the simazine registration review case will occur after: (1) an EDSP FFDCA § 408(p) determination, and (2) an endangered species determination under the ESA and any needed § 7 consultation with the Services.

B. Implementation of Mitigation Measures

Once the Interim Registration Review Decision is issued, the simazine registrants must submit amended labels that include the label changes described in Appendices A and B. The revised labels and requests for amendment of registrations must be submitted to the Agency for review within 60 days following issuance of the Interim Registration Review Decision in the docket.

Registrants must submit a cover letter, a completed Application for Registration (EPA form 8570-1) and electronic copies of the amended product labels. Two copies for each label must be submitted, a clean copy and an annotated copy with changes. In order for the application to be processed, registrants must include the following statement on the Application for Registration (EPA form 8570-1):

"I certify that this amendment satisfies the requirements of the Propazine Interim Registration Review Decision and EPA regulations at 40 CFR Section 152.44, and no other changes have been made to the labeling of this product. I understand that it is a violation of 18 U.S.C. Section 1001 to willfully make any false statement to EPA. I further understand that if this amendment is found not to satisfy the requirements of the Propazine Interim Registration Review Decision and 40 CFR Section 152.44, this product may be in violation of FIFRA and may be subject to regulatory and/or enforcement action and penalties under FIFRA."

Within the required timeframe, registrants must submit the required documents to the Re-evaluation section of EPA's Pesticide Submission Portal (PSP), which can be accessed through EPA's Central Data Exchange (CDX) using the following link: https://cdx.epa.gov/. Registrants may instead send paper copies of their amended product labels, with an application for a fast-track, Agency-initiated non-PRIA label amendment to Christian Bongard at one of the following addresses, so long as the labels and application are submitted within the required timeframe:

VIA US Mail
USEPA Office of Pesticide Programs
Pesticide Re-evaluation Division
Mail Code 7508P
1200 Pennsylvania Ave NW
Washington, DC 20460-0001

VIA Courier
Pesticide Re-evaluation Division
c/o Front End Processing
Room S-4910, One Potomac Yard
2777 South Crystal Drive
Arlington, VA 22202-4501

Appendix A: Summary of Required Actions for Simazine

Registration Review Case#: 0070
PC Code: 080807
Chemical Type: Herbicide
Chemical Family: Triazine
Mechanism of Action: 5

Affected Population(s)	Source of Exposure	Route of Exposure	Duration of Exposure	Potential Risk(s) of Concern	Required Actions	Comment (use to briefly clarify or elaborate on risk or mitigation)
Occupational handler (applicator of simazine via mechanically-pressurized handgun on numerous uses)	• Air (e.g., respirable particles at/on site while mixing/loading) • Residues (e.g., at /on site while mixing/loading)	Combined dermal and inhalation	4-day and longer	LH surge suppression	Limit application to spot treatment only	
Occupational handler (applicator of simazine via backpack sprayer on oranges and grapefruit)	• Air (e.g., respirable particles at/on site while mixing/loading) • Residues (e.g., at /on site while mixing/loading)	Combined dermal and inhalation	4-day and longer	LH surge suppression	Require additional PPE (coveralls over long sleeve shirts and long pants)	
Post-Application Residential and Recreational	• Chlorotriazine cumulative aggregate exposure (food +water + residential post-application exposure to treated residential turf)	• Dietary (food) • Combined dermal and incidental oral (residential post-application to treated residential turf)	4-day and longer	LH surge suppression	Either Reduce Application Rate to 0.65 lb ai/A or Require Post-Application Irrigation plus a Reduced Application Rate of 1.6 lb ai/A	
Avian	Dietary and spray drift	Ingestion	Chronic	Growth	Enforceable spray drift management measures	Label clarification
Mammals	Dietary and spray drift	Ingestion	Chronic	Reproductive and Growth	Enforceable spray drift management measures	Label clarification
Terrestrial Plants	Spray drift	Direct contact	Acute Chronic	Growth	Enforceable spray drift management measures	Label clarification
Aquatic plants (nonvascular)	Spray drift and runoff	Direct contact	Acute Chronic	Growth	Enforceable spray drift management measures	Label clarification

Appendix B: Required Labeling Changes for Simazine Products

Description	Required Label Language for Simazine Products	Placement on Label
PPE Requirement For backpack application of DF, WDG, and liquid formulations on Grapefruit and Oranges	Mixer/loader/applicators for backpack application to grapefruit and oranges are required to wear coveralls over long-sleeve shirts and long pants clothing	
Use Restrictions for mechanically pressurized handguns of DF, WDG, and liquid formulations	• Applications made by mechanically pressurized handguns are restricted to spot treatment only for the following uses o Citrus (Grapefruit, Oranges, Lemons) o Pome Fruits (Apples, Pears) o Stone Fruits (Cherries [sweet and tart], peaches, Plums, Nectarines) o Tree Nuts (Pecans, Walnuts, Filberts, Almonds, Macadamia Nuts o Berry and Small Fruit (Blueberries, Blackberries, Loganberries, Raspberries, Grapes, Lowbush Blueberries, Cranberries) o Tropical and Sub-tropical Fruits (Avocado, Olive) o Nursery/Ornamentals o Sweet Corn • Applications made by mechanically pressurized handguns to strawberries are restricted to either spot treatment only or mixer/loader/applicators are required to wear coveralls over long sleeve shirts and long pants of clothing.	
	End Use Products	
Mechanism of Action Group Number	**Note to registrant:** • Include the name of the **ACTIVE INGREDIENT** in the first column • Include the word "**GROUP**" in the second column • Include the **MODE/MECHANISM OF ACTION CODE** in the third column (for herbicides this is the Mechanism of Action, for fungicides this is the FRAC Code, and for insecticides this is the Primary Site of Action) • Include the type of pesticide (*i.e.*, **HERBICIDE** or **FUNGICIDE** or **INSECTICIDE)** in the fourth column.	Front Panel, upper right quadrant. All text should be black, bold face and all caps on a white background, except the mode of action code, which should be white, bold face and all caps on a black background; all text and columns should

Description	Required Label Language for Simazine Products	Placement on Label
	Simazine **GROUP** [redacted] **Herbicide**	be surrounded by a black rectangle.
For products registered for use on turf	For residential turf on lawns, institutional turf, parks or recreational fields, the maximum application rate may either be: • 1.6 lb ai/A paired with the requirement of 0.5 inches of irrigation; or • 0.65 lb ai/A without irrigation. NOTE: No change for golf course turf and sod farms uses.	Directions for Use
Updated Gloves Statement	Update the glove statements to be consistent with Chapter 10 of the Label Review Manual	In the Personal Protective Equipment (PPE) within the Precautionary Statements and Agricultural Use Requirements, if applicable
Updated Respirator Language	[**Note to registrant**: If your end-use product only requires protection from particulates only (low volatility), use the following language:] "Wear a minimum of a NIOSH-approved particulate filtering facepiece respirator with any N*, R or P filter; OR a NIOSH-approved elastomeric particulate respirator with any N*, R or P filter; OR a NIOSH-approved powered air purifying respirator with HE filters." *Drop the "N" option if there is oil in the product's formulation and/or the product is labeled for mixing with oil-containing products. [**Note to registrant:** For respiratory protection from organic vapor **and** particulates (or aerosols), use the following language:] "Wear a minimum of a NIOSH-approved elastomeric half mask respirator with organic vapor (OV) cartridges and combination N*, R, or P filters; OR a NIOSH-approved gas mask with OV canisters; OR a NIOSH-approved powered air purifying respirator with OV cartridges and combination HE filters." [**Note to registrant:** For products requiring protection for organic vapor only, use the following language:]	In the Personal Protective Equipment (PPE) within the Precautionary Statements

Description	Required Label Language for Simazine Products	Placement on Label
	"Wear a minimum of a NIOSH-approved elastomeric half mask respirator with organic vapor (OV) cartridges; OR a NIOSH-approved full face respirator with OV cartridges; OR a gas mask with OV canisters; OR a powered air purifying respirator with OV cartridges." *Drop the "N" option if there is oil in the product's formulation and/or the product is labeled for mixing with oil-containing products.	
Non-target Organism Advisory Statement	"NON-TARGET ORGANISM ADVISORY STATEMENT: This product is toxic to plants and may adversely impact the forage and habitat of non-target organisms, including pollinators, in areas adjacent to the treated site. Protect the forage and habitat of non-target organisms by following label directions intended to minimize spray drift."	Environmental Hazards
HERBICIDE RESISTANCE MANAGEMENT: Weed Resistance Management	Include resistance management label language for herbicides from PRN 2017-1 and PRN 2017-2 (https://www.epa.gov/pesticide-registration/pesticide-registration-notices-year)	Directions for Use, prior to directions for specific crops under the heading "WEED RESISTANCE-MANAGEMENT"
Additional Required Labelling Action **Applies to all products delivered via liquid spray applications**	Remove information about volumetric mean diameter from all labels where such information currently appears.	Directions for Use
Directions for mixing/loading products packaged in water soluble bags	Instructions for Introducing Water Soluble Packages Directly into Spray tanks: "Soluble Packages (WSPs) are designed to dissolve in water. Agitation may be used, if necessary, to help dissolve the WSP. Failure to follow handling and mixing instructions can increase your exposure to the pesticide products in WSPs. WSPs, when used properly, qualify as a closed mixing/loading system under the Agricultural Worker Protection Standard [40 CFR 170.607(d)]. Handling Instructions Follow these steps when handling pesticide products in WSPs. 1.Mix in spray tank only. 2.Handle the WSP in a manner that protects package from breakage and/or unintended release of contents. If package is broken, put on PPE required for clean-up and then continue with mixing instructions.	

Description	Required Label Language for Simazine Products	Placement on Label
	3.Keep the WSP in outer packaging until just before use. 4.Keep the WSP dry prior to adding to the spray tank. 5.Handle with dry gloves and according to the label instructions for PPE. 6.Keep the WSP intact. Do not cut or puncture the WSP. 7.Reseal the WSP outer packaging to protect any unused WSP(s). Mixing Instructions Follow the steps below when mixing this product, including if it is tank-mixed with other pesticide products. If being tank-mixed, the mixing directions 1 through 9 below take precedence over the mixing directions of the other tank mix products. WSPs may, in some cases, be mixed with other pesticide products so long as the directions for use of all the pesticide product components do not conflict. Do not tank-mix this product with products that prohibit tank-mixing or have conflicting mixing directions. 1.If a basket or strainer is present in the tank hatch, remove prior to adding the WSP to the tank. 2.Fill tank with water to approximately one-third to one-half of the desired final volume of spray. 3.Stop adding water and stop any agitation. 4.Place intact/unopened WSP into the tank. 5.Do not spray water from a hose or fill pipe to break or dissolve the WSP. 6.Start mechanical and recirculation agitation from the bottom of tank without using any overhead recirculation, if possible. If overhead recirculation cannot be turned off, close the hatch before starting agitation. 7.Dissolving the WSP may take up to 5 minutes or longer, depending on water temperature, water hardness and intensity of agitation. 8.Stop agitation before tank lid is opened. 9.Open the lid to the tank, exercising caution to avoid contact with dusts or spray mix, to verify that the WSP has fully dissolved and the contents have been thoroughly mixed into the solution. 10.Do not add other allowed products or complete filling the tank until the bags have fully dissolved and pesticide is thoroughly mixed. 11.Once the WSP has fully dissolved and any other products have been added to the tank, resume filling the tank with water to the desired level, close the tank lid, and resume agitation. 12.Use the spray solution when mixing is complete. 13.Maintain agitation of the diluted pesticide mix during transport and application. 14.It is unlawful to use any registered pesticide, including WSPs, in a manner inconsistent with its label. ENGINEERING CONTROLS Water soluble packets, when used correctly, qualify as a closed mixing/loading system under the Worker Protection Standard [40 CFR 170.607(d)]. Mixers and loaders handling this product while it is enclosed in intact water-soluble packets may elect to wear reduced PPE of long-sleeved shirt, long pants, shoes, socks, a chemical-resistant apron, and chemical-resistant gloves. When reduced PPE is worn because a closed system is being used, handlers must be	

Description	Required Label Language for Simazine Products	Placement on Label
	provided all PPE specified above for "applicators and other handlers" and have such PPE immediately available for use in an emergency, such as in case of a spill or equipment break-down."	
Spray Drift Management Application Restrictions for products that are applied as liquids and allow ground boom applications	**"SPRAY DRIFT** **Ground Boom Applications:** • User must only apply with the release height recommended by the manufacturer, but no more than 4 feet above the ground or crop canopy. • Applicators are required to use a coarse or coarser droplet size (ASABE S572). • Do not apply when wind speeds exceed 10 miles per hour at the application site. • Do not apply during temperature inversions."	Directions for Use, in a box titled "Spray Drift" under the heading "Ground Boom Applications"
Advisory Spray Drift Management Language for all products delivered via liquid spray application	**"SPRAY DRIFT ADVISORIES** THE APPLICATOR IS RESPONSIBLE FOR AVOIDING OFF-SITE SPRAY DRIFT. BE AWARE OF NEARBY NON-TARGET SITES AND ENVIRONMENTAL CONDITIONS. **IMPORTANCE OF DROPLET SIZE** An effective way to reduce spray drift is to apply large droplets. Use the largest droplets that provide target pest control. While applying larger droplets will reduce spray drift, the potential for drift will be greater if applications are made improperly or under unfavorable environmental conditions. **Controlling Droplet Size – Ground Boom** ***(note to registrants:*** *remove if ground boom is prohibited on product labels)* • Volume - Increasing the spray volume so that larger droplets are produced will reduce spray drift. Use the highest practical spray volume for the application. If a greater spray volume is needed, consider using a nozzle with a higher flow rate. • Pressure - Use the lowest spray pressure recommended for the nozzle to produce the target spray volume and droplet size. • Spray Nozzle - Use a spray nozzle that is designed for the intended application. Consider using nozzles designed to reduce drift. **BOOM HEIGHT – Ground Boom** ***(note to registrants:*** *remove if ground boom is prohibited on product labels)* For ground equipment, the boom should remain level with the crop and have minimal bounce. **SHIELDED SPRAYERS** Shielding the boom or individual nozzles can reduce spray drift. Consider using shielded sprayers. Verify that the shields are not interfering with the uniform deposition of the spray on the target area. **TEMPERATURE AND HUMIDITY** When making applications in hot and dry conditions, use larger droplets to reduce effects of evaporation.	Directions for Use, just below the Spray Drift box, under the heading "Spray Drift Advisories"

Description	Required Label Language for Simazine Products	Placement on Label
	TEMPERATURE INVERSIONS Drift potential is high during a temperature inversion. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. The presence of an inversion can be indicated by ground fog or by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing. Avoid applications during temperature inversions. **WIND** Drift potential generally increases with wind speed. AVOID APPLICATIONS DURING GUSTY WIND CONDITIONS. Applicators need to be familiar with local wind patterns and terrain that could affect spray drift."	
Advisory Spray Drift Management Language for all products that allow liquid applications with handheld technologies	"**SPRAY DRIFT ADVISORIES** **Handheld Technology Applications:** • Take precautions to minimize spray drift."	Directions for Use, just below the Spray Drift box, under the heading "Spray Drift Advisories"

Exhibit C

to Petition for Review

Docket Number EPA-HQ-OPP-2013-0266
www.regulations.gov

Atrazine

Interim Registration Review Decision
Case Number 0062

September 2020

Approved by: _____

Elissa Reaves, Ph.D.
Acting Director
Pesticide Re-evaluation Division

Date: 09/14/2020

Table of Contents

I. INTRODUCTION

This document is the Environmental Protection Agency's (EPA or the Agency) Interim Registration Review Decision (ID) for atrazine (PC Code 080803, case 0062), and is being issued pursuant to 40 CFR §§ 155.56 and 155.58. A registration review decision is the Agency's determination whether a pesticide continues to meet, or does not meet, the standard for registration in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The Agency may issue, when it determines it to be appropriate, an interim registration review decision before completing a registration review. Among other things, the interim registration review decision may specify new risk mitigation measures, impose interim risk mitigation measures, identify data or information required to complete the review, and include schedules for submitting the required data, conducting the new risk assessment and completing the registration review. Additional information on atrazine, can be found in EPA's public docket (EPA-HQ-OPP-2013-0266) at www.regulations.gov.

FIFRA, as amended by the Food Quality Protection Act (FQPA) of 1996, mandates the continuous review of existing pesticides. In general, all pesticides distributed or sold in the United States must be registered by EPA based on scientific data showing that they will not cause unreasonable risks to human health or to the environment when used as directed on product labeling. The registration review program is intended to make sure that, as the ability to assess and reduce risk evolves and as policies and practices change, all registered pesticides continue to meet the statutory standard of no unreasonable adverse effects. Changes in science, public policy, and pesticide use practices will occur over time. Through the registration review program, the Agency periodically re-evaluates pesticides to make sure that as these changes occur, products in the marketplace can continue to be used safely. Information on this program is provided at http://www.epa.gov/pesticide-reevaluation. In 2006, the Agency implemented the registration review program pursuant to FIFRA § 3(g) and will review each registered pesticide every 15 years to determine whether it continues to meet the FIFRA standard for registration.

EPA is issuing an ID for atrazine so that it can (1) move forward with aspects of the registration review that are complete and (2) implement interim risk mitigation (see Appendices A and B). The Agency is currently working with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (collectively referred to as, "the Services") to improve the consultation process for threatened and endangered (listed) species assessments for pesticides in accordance with the Endangered Species Act (ESA) § 7. The Agency will complete its listed species assessment and any necessary consultation with the Services for atrazine prior to completing the atrazine registration review. Likewise, the Agency will complete endocrine screening for atrazine, pursuant to the Federal Food, Drug, and Cosmetic Act (FFDCA) § 408(p), before completing registration review.

Atrazine is an herbicide that can be used to control broadleaf and grassy weeds. Atrazine is a member of the chlorotriazine chemical class, which includes simazine and propazine along with the three following chlorinated metabolites: desethyl-s-atrazine (DEA), desisopropyl-s-atrazine (DIA), and diaminochlorotriazine (DACT). EPA has determined that the chlorotriazines

(triazines) and their three chlorinated metabolites share a common mechanism of toxicity, and as such, human health risks were assessed together through a triazine cumulative risk assessment for atrazine, simazine, propazine, and their chlorinated metabolites. Pesticide products containing atrazine are registered for use on several agricultural crops, with the highest use on corn, sorghum, and sugarcane. Additionally, atrazine products are registered for use on wheat, guava, macadamia nuts, and range grasses and for several non-agricultural use sites such as ornamentals, Christmas trees, and sod. There are also registered residential and recreational uses on turf such as on parks, golf courses, school grounds, or home lawns and for some commercial and industrial use sites. The first product containing atrazine was registered in 1958, and therefore atrazine was subject to reregistration. There are four technical registrants for atrazine products: Syngenta Crop Protection, LLC., ADAMA USA, Drexel Chemical Company, and Sipcam Agro USA, Inc.

This document is organized in five sections: the *Introduction*, which includes this summary and a summary of public comments and EPA's responses; *Use and Usage*, which describes how and why atrazine is used and summarizes data on its use; *Scientific Assessments*, which summarizes EPA's risk and benefits assessments, updates or revisions to previous risk assessments, and provides broader context with a discussion of risk characterization; the *Interim Registration Review Decision*, which describes the mitigation measures proposed to address risks of concern and the regulatory rationale for EPA's ID; and, lastly, the *Next Steps and Timeline* for completion of this registration review.

A. Updates Since the Proposed Interim Registration Review Decision was Issued

In January 2020, the Agency published the PID for atrazine and took public comment for 60 days. After finalizing the atrazine PID, the Agency found that the PID inadvertently did not address potential occupational risks of concern identified in the draft human health risk assessment for loading/applying dry-flowable (DF)/water dispersable granules (WDG) and liquid formulations for backpack spray applications to roadsides. This scenario was mistakenly omitted from the PID, but is addressed in the ID.

Also after the publication of the PID, the Agency received a letter from the atrazine technical registrants indicating their intent to voluntarily delete all roadside uses from their registrations, which would effectively mitigate the potential risk resulting from the mistakenly omitted use scenario. The deletion of roadside uses also mitigates the potential risk to occupational handlers applying atrazine via mechanically pressurized handgun and would supersede the mitigation proposed for this scenario in the PID. The proposed use deletion will be announced in the Federal Register for public comment. After any comments are reviewed, the final use deletion order will also be announced in the Federal Register. For more information please refer to Section IV.A. and Appendix A.

During the 60-day comment period on the PID, the Agency also received a comment from Syngenta Crop Protection, LLC regarding the proposed increase to the tolerance levels for meat, milk, poultry and eggs. Syngenta commented that the proposed changes to the tolerance

expression could create a potential trade irritant with other export countries, including Mexico. The current tolerance levels are safe, and the proposed changes were not intended to address a risk concern, rather they were intended to harmonize U.S. tolerances with Canadian tolerances. Based on concerns regarding the potential for trade irritants with other export countries, tolerance levels for livestock commodities will not be changed from their current levels. For more information please see Section I. C., *Summary of Public Comments on the Proposed Interim Decision and Agency Responses*, below and the *Atrazine, Simazine, Propazine: Human Health Response to Public Comments on Proposed Interim Decision* in the registration review docket (EPA-HQ-OPP-2013-0266).

Endangered Species Assessment

Atrazine is one of the chemicals mentioned in a stipulated partial settlement agreement in the case of Center for Biological Diversity et. al., v. United States Environmental Protection Agency et al., No. 3:11 cv 0293 (N.D. Cal.). Among other provisions, this agreement sets a September 28, 2021 deadline for EPA to complete nationwide ESA section 7(a)(2) effects determination for atrazine and simazine and, as appropriate, request initiation of any ESA section 7(a)(2) consultations with the Services that EPA may determine to be necessary as a result of those effects determinations. EPA also stated in this settlement that the Agency would also include propazine in this group of effects determinations. Prior to completing the effects determination, the Agency plans to issue a draft biological evaluation for atrazine, simazine, and propazine for a 60-day public comment period by the end of November 2020.

In an effort to streamline and improve the biological evaluation and any subsequent consultations with the Services, as appropriate, the atrazine technical registrants Syngenta Crop Protection, LLC., ADAMA USA, Drexel Chemical Company, and Sipcam Agro USA, Inc. voluntarily committed to making several modifications to atrazine product labels and registrations.[1] In addition to removing several use patterns, atrazine technical registrants have committed to implementing certain geographic restrictions and buffers from listed species' locations and/or critical habitats. These label changes are expected to reduce the extent of exposure and risk to both listed and non-listed species whose range and/or habitat co-occur with the use of atrazine. EPA will work with registrants to implement these voluntary label changes on the same timeframe as the necessary mitigation measures described in Section IV of this ID. In addition, for label modifications that are subject to the use deletion process under FIFRA 6(f), EPA will announce these modifications in the Federal Register and open a public comment period for a minimum of 30 days.

Atrazine technical registrants have committed to the following voluntary label modifications:

- Prohibit all uses of atrazine in Hawaii, Alaska, and the U.S. territories (Puerto Rico, Guam, American Samoa, the U.S. Virgin Islands, and the North Mariana Islands), thereby restricting registered uses to the contiguous United States.
- Remove "Roadside" use
- Remove "Conservation Reserve Program (CRP)" use

[1] See registrant commitment letters located in the atrazine docket at [EPA-HQ-OPP-2013-0266].

- Remove "Conifer" uses, including Christmas trees, timber and all forestry uses
- Restrict "Fallow" uses to the following scenarios and geographies only:
    - o Wheat-Corn-Fallow in CO, KS, ND, NE, SD & WY
    - o Wheat-Fallow-Wheat in CO, KS, ND, NE, SD & WY
    - o Wheat-Sorghum-Fallow in AR, CO, GA, IL, KS, LA, MS, MO, NE, NM, NC, OK, SD & TX
- Remove Miscanthus and/or Bioenergy Crops use
- Require an in-field downwind buffer of 15 feet (4.6 meters) for ground applications and 150 feet (46 meters) for aerial applications:
    - o from the edge of all streams and rivers as well as the high-tide line for all estuarine/marine environments, and
    - o from threatened and endangered species critical habitat and/or species locations.

There have been no additional updates to what was proposed in the PID, nor any updates to the draft risk assessments (DRAs), which are available in the public docket.

B. Summary of Atrazine Registration Review

Pursuant to 40 CFR § 155.50, EPA formally initiated registration review for atrazine with the opening of the registration review docket for the case (EPA-HQ-OPP-2013-0266). The following summary highlights the docket opening and other significant milestones that have occurred thus far during the registration review of atrazine.

- June 2013 - The *Atrazine Preliminary Work Plan* (PWP) (June 2013), *Atrazine, Propazine, and Simazine. Human Health Risk Scoping Document in Support ofRegistration Review* (June 2013), and *Addendum to the Problem Formulation for the Ecological Risk Assessment to be Conducted for the Registration Review of Atrazine* (May 2013) were posted to the docket for a 60-day public comment period.

- December 2013 - The *Final Work Plan* (FWP) for atrazine was issued. The Agency received public comment on the PWP, but the comments did not result in changes to the risk assessment, anticipated data needs, or time frame of registration review activities. No data needs were identified in the PWP or FWP, therefore a generic data call-in (GDCI) was not issued prior to development of the draft risk assessments.

- June 2016 - The Agency announced the availability of the *Refined Ecological Risk Assessment for Atrazine* and took public-comment for 120-days. During the public-comment period, the Agency received approximately 80,000 public comments either supporting or opposing the continued registration of atrazine, and/or providing information about the use and benefits of atrazine for growers. Comments were submitted by individual citizens, the atrazine technical registrants, various trade organizations (e.g., agricultural growers and industry groups), and other non-governmental organizations.

  As a result of these comments and other considerations, the Agency reconsidered its risk assessment methodology used in the draft ecological risk assessment. For more

information see the *Regulatory Update on the Registration Review of Atrazine* (October 22, 2019), which is available in the public docket.

- July 2018 - The Agency announced the availability of the *Atrazine. Draft Human Health Risk Assessment for Registration Review* and the *Chlorotriazines: Cumulative Human Health Risk Assessment - Atrazine, Propazine, and Simazine* and took public comment for 120-days. During the public-comment period, the Agency received over 58,300 comments, either supporting or opposing the continued registration and use of atrazine, and/or providing information about the use and benefits of atrazine for growers. Comments were submitted by individual citizens, the atrazine technical registrants, various trade organizations (e.g., agricultural growers and industry groups), and other non-governmental organizations. These comments did not change the risk assessments or registration review timeline for atrazine.

- December 2018 - A Generic Data Call-In (GDCI) for atrazine was issued for multiresidue data that were identified as a deficiency in the draft human health risk assessments. The required data are currently under development and due to be submitted to the Agency by December 20, 2020.

- January 2020 - The Agency announced the availability of the *Atrazine Proposed Interim Registration Review Decision* and took public comment for 60 days.

- September 2020- The Agency has completed the ID for atrazine. docket. Along with the ID, the following documents will be posted to the atrazine docket:

    - Atrazine, Simazine, and Propazine —Environmental Fate and Effects Division's Response to Public Comments on Preliminary Interim Decision (PID). August 24, 2020
    - Biological and Economic Analysis Division's (BEAD) Response to Comments on the Benefit Assessments for Triazine Use on Field Corn, Sorghum, Fallow, Sweet Corn, Sugarcane, Orchards, Vineyards, Caneberries, Strawberries, Christmas Trees, Forestry, Rights-of-Way, Turfgrass, and Nurseries. September 10, 2020
    - Atrazine, Simazine, Propazine: Human Health Response to Public Comments on Proposed Interim Decision. September 9, 2020

C. Summary of Public Comments on the Proposed Interim Decision and Agency Responses

During the 60-day public comment period for the PID, which opened on January 2, 2020, and closed on March 2, 2020, the Agency received roughly 60,189 comments. Approximately 321 unique submissions were received from various stakeholders, including atrazine registrants, grower groups, non-governmental organizations, pesticide industry groups, states, the U.S. Department of Agriculture and members of the general public. Most comments came from mass mailer campaigns either supporting or opposing the continued registration of atrazine. Many comments specifically referenced changes to the aquatic plant community-equivalent level of

concern (CE-LOC) discussed in the *Regulatory Update on the Registration Review of Atrazine* (October 22, 2019), which is available in the public docket.

Comments that are technical in nature are more fully addressed in the *Atrazine, Simazine, and Propazine —Environmental Fate and Effects Division's Response to Public Comments on Preliminary Interim Decision (PID)*; *Atrazine, Simazine, Propazine: Response to Public Comments on Proposed Interim Decision; and Biological and Economic Analysis Division's (BEAD) Response to Comments on the Benefit Assessments for Triazine Use on Field Corn, Sorghum, Fallow, Sweet Corn, Sugarcane, Orchards, Vineyards, Caneberries, Strawberries, Christmas Trees, Forestry, Rights-of-Way, Turfgrass, and Nurseries.* Comments of a regulatory nature and comments that resulted in changes to the ID are summarized and addressed below.

Comments Regarding the *Regulatory Update on the Registration Review of Atrazine* (October 22, 2019) and the Concentration-Equivalent Level of Concern (CE-LOC) for aquatic plant communities

Comment: During the PID comment period the Agency received comments from a wide array of stakeholders either in support of or against the Agency's decision to use the concentration of 15 µg/L as a 60-day average for the concentration-equivalent level of concern (CE-LOC) which is used to determine potential risk to aquatic plant communities.

EPA Response: The Agency appreciates the commenters' input. However, the Agency's decision to use the concentration of 15 µg/L as a 60-day average for the CE-LOC has not changed. As discussed in the PID, in response to significant public comments, concerns, and inherent uncertainty related to the data, assumptions, and interpretations used to arrive at the CE-LOC in the 2016 draft atrazine ecological risk assessment, EPA considered alternate approaches for inclusion, evaluating/scoring, and interpretation of the atrazine ecosystem and related studies (*e.g.*, mesocosm and microcosm studies). The Agency acknowledges that differences in the interpretation of effects, scoring methodology, and splitting of functional groups can greatly influence the resulting CE-LOC. There are also sources of uncertainty inherent in the models used to calculate the CE-LOC. Utilizing the scoring and study exclusions recommended by the 2012 Scientific Advisory Panel (SAP)[2] for mesocosm and microcosm studies, and accounting for model sources of uncertainty, the resulting CE-LOC ranges from 1.9 to 26 µg/L with a median of 8.5 µg/L.

Given the complex nature of mesocosm and microcosm studies, the various protocols used in the conduct of these studies, the model uncertainty described in the 2016 risk assessment, the recommendation of the SAP, the potential for recovery of the aquatic plant community following exposure, and the high agricultural benefits provided by atrazine, the Agency considers it appropriate to present a range of concentrations that accounts for these factors for risk management purposes under Registration Review. In view of the range of 1.9 to 26 µg/L, the

[2] In June 2012, EPA held a meeting of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel (SAP) to review the Agency's problem formulation for the environmental fate and ecological risk assessment for atrazine. During this SAP, EPA presented a refined methodology for determining the magnitude and frequency of atrazine exposures below which significant changes in aquatic plant community structure, function and productivity are not expected. The Agency also presented its review of atrazine studies with amphibians published in the open literature since 2007. (Docket ID EPA-HQ-OPP-2012-0230. https://www.regulations.gov/docket?D=EPA-HQ-OPP-2012-0230).

Agency believes it is reasonable to focus on the upper end of the range as recovery is more likely at lower concentrations. Therefore, for the purpose of determining the need for any potential regulatory action or mitigation to protect aquatic plant communities during Registration Review, EPA will use the concentration of 15 µg/L as a 60-day average, which is at the upper end of the distribution of values. For more information see the October 22, 2019, *Regulatory Update on the Registration Review of Atrazine* available in the public docket (EPA-HQ-OPP-2013-0266).

Comments submitted by Syngenta Crop Protection, LLC (Docket ID: EPA-HQ-OPP-2013-0266-1564)

Comment: Syngenta commented that EPA's proposal to increase the established atrazine residue tolerances of 0.02 ppm for meat, milk, poultry and eggs to 0.04 ppm in order to harmonize with Canada's Pest Management Regulatory Agency (PMRA) could create a potential trade irritant with other export countries, including Mexico. Syngenta requested that the U.S. tolerances remain unchanged until there is additional harmonization around the world.

EPA Response: EPA agrees with Syngenta's comment; the tolerances for atrazine residues in meat, milk, poultry and eggs will remain at their current level of 0.02 ppm. The current tolerance levels are safe, and the proposed changes were not intended to address a risk concern, rather they were intended to harmonize U.S. tolerances with Canadian tolerances.

Comments submitted by the National Agricultural Aviation Association (Docket ID: EPA-HQ-OPP-2013-0266-1547)

Comment: NAAA supports the spray drift mitigation language for atrazine. NAAA supports label language of not applying during temperature inversions but suggests amending it to "do not apply during low-level temperature inversions."

EPA Response: EPA believes that the phrase "do not apply during low-level temperature inversions" does not provide adequate clarification due to the difficulty of defining the altitude where inversion conditions may not impact drift. Thus, the Agency is not specifying "low-level."

Comments submitted by the Center for Biological Diversity (Docket ID: EPA-HQ-OPP-2013-0266-1569)

Comment: CBD feels that the proposed mitigation measures to reduce environmental exposure and risk will not result in a "no unreasonable adverse effects" determination for endangered species.

EPA Response: The required mitigation combined with the required product stewardship measures, which are explained in section IV.A. *Risk Mitigation and Regulatory Rationale*, are expected to reduce the extent of exposure and are intended to reduce risk to listed species whose range and/or critical habitat co-occur with the use of atrazine. An endangered species assessment for atrazine is currently underway. Based on the findings on the atrazine endangered species assessment, additional mitigation measures may be required.

Comment: CBD notes that the Agency's proposed mitigation does not include measures intended to reduce atrazine runoff.

Response: Significant measures intended to reduce contamination of surface and groundwater due to atrazine runoff are currently in place. These measures include prohibition of certain application methods, prohibition of certain uses, rate reductions for applications made to high acreage crops, requirements for soil incorporation, setback requirements for mixing, loading, and applying atrazine products near waterways, restrictions against applications near standpipes, construction requirements for bulk storage facilities to prevent point source contamination from spills, classification of all atrazine containing products (except for the lawn care, turf, and conifer uses) as Restricted Use Pesticides (RUPs). In evaluating potential risk mitigation for atrazine, EPA considered the risks, the benefits, and the use pattern. Although there are potential risks of concern associated with the use of atrazine, considering the measures currently in place which are intended to reduce runoff, any remaining potential ecological risks are outweighed by the benefits associated with use of atrazine.

II. USE AND USAGE

Atrazine is a triazine herbicide with products registered for use for pre- and post-emergent control of broadleaf and grassy weeds. Products containing atrazine are registered for use on corn, sweet corn, sorghum, sugarcane, macadamia nuts, guava, fallow crop lands, conifers, Christmas tree farms, sod farms, ornamental plants, ornamental turfgrass sites, including residential lawns, school grounds, parks, playgrounds, and golf courses and other athletic fields, conservation reserve program (CRP) areas, and roadsides/highway rights-of-way. Atrazine is also registered for use on miscanthus and other non-food perennial bioenergy crops. Atrazine products containing greater than 4% active ingredient are restricted use pesticides (RUP), which can only be applied by certified applicators or those under their supervision.

Atrazine products are registered in a variety of formulations, including granular, water dispersible granules, emulsifiable concentrates, flowable concentrates, soluble concentrate, ready-to-use products, and water-soluble packages. Atrazine may also be applied to various field crops in dry bulk fertilizers (DBF). Atrazine products may be applied via groundboom sprayers, aircraft, tractor-drawn and push-type spreaders, backpack sprayers, and mechanical and manually pressurized hand sprayers.

An average of about 72 million pounds of atrazine is used annually in agriculture. Three crops, corn, sorghum and sugarcane, account for over 98 percent of this use. Field corn accounts for most of the use with approximately 62.3 million pounds applied annually. Annual use of atrazine on sorghum is estimated between 6.4 million pounds; annual sugarcane use is estimated at 2.1 million pounds; and annual sweet corn use is estimated around 300,000 pounds. Total use has remained relatively constant over the past decade. Use rates per acre have decreased, while total acres treated with atrazine have remained relatively stable. (Market Research Data (MRD). 2013-2017)

In 2013, reported use of atrazine on non-agricultural sites included nurseries/ornamentals (120,000 lbs), sod farms (100,000 lbs) and institutional turfgrass (120,000 lbs) (Kline, 2013).

There was also reported use of atrazine in the consumer market on residential lawns (300,000 lbs) in 2016 and in forestry (53,000 lbs) in 2017 (NAMRD, 2016, 2017).

III. SCIENTIFIC ASSESSMENTS

A. Human Health Risks

A summary of the Agency's human health risk assessments is presented below. The Agency used the most current science policies and risk assessment methodologies to prepare a risk assessment in support of the registration review of atrazine. In addition, EPA has made a determination of a common mechanism of toxicity for atrazine, simazine, propazine, and their chlorinated metabolites; therefore, in addition to assessing potential risk from atrazine, EPA evaluated the potential cumulative risk from combined exposure to the chlorotriazines and their chloro metabolites. For additional details on the draft human health risk assessments, see the *Atrazine. Draft Human Health Risk Assessment for Registration Review* and the *Chlorotriazines: Cumulative Human Health Risk Assessment - Atrazine, Propazine, and Simazine*, which are available in the public docket (EPA-HQ-OPP-2013-0266).

For registration review, the predominant adverse health effect of concern for chlorotriazines is suppression of the luteinizing hormone (LH) surge leading to neuroendocrine effects. This effect was observed in rat studies after four days of exposure; therefore, potential risk was assessed using a 4-day duration of exposure rather than EPA's typical short- or intermediate-term duration of exposure. Disruptive hormonal effects related to LH surge are different for different age groups and sexes, and the downstream adverse effects vary considerably. Exposures during early life may lead to effects later in life including delays in sexual maturation, inflammation of the prostate, effects related to development of the genitalia, and/or irregular menstrual cycles. Therefore, this endpoint is applicable for males and females, and all life-stages.

For acute assessment for atrazine and its chlorinated metabolites, the toxicological endpoint is delayed ossification in fetuses and is only applicable to females 13-49 years old. For the 4-day assessment for atrazine and its chlorinated metabolites, the endpoint is attenuation of LH surge and is applicable to all life-stages.

The hydroxy metabolites of atrazine are major metabolites in plants but not in livestock. Dermal and inhalation exposures are not expected for the hydroxy metabolites of atrazine; however, chronic dietary exposures are expected. The chronic endpoint (kidney effects) is applicable to all life-stages.

1. Risk Summary and Characterization

Dietary (Food + Water) Risks

EPA's dietary risk assessments did not identify any potential acute, 4-day, chronic, or cancer risks of concern associated with dietary exposure to atrazine and its chlorinated metabolites or to the hydroxy metabolites of atrazine. Atrazine has been classified as "not likely to be

carcinogenic to humans"; therefore, a quantitative cancer dietary risk assessment was not conducted.

Residential Handler Risks

Atrazine products are registered for use on residential turf, however most atrazine product labels require the use of baseline attire (e.g., long-sleeved shirt/long pants) and/or additional personal protective equipment (PPE) and are assumed to be applied by professional applicators in residential settings. Some granular formulations do not require PPE on the labels, and therefore the residential handler assessment included only granular products. There are no residential handler combined (dermal + inhalation) risk estimates of concern for the registered uses of atrazine on residential turf.

Residential Post-Application Risks

Residential post-application exposure is expected via the dermal route for adults, children 11 to 16 years old, children 6 to 11 years old, and children 1 to < 2 years old; and via incidental oral exposure (i.e., hand-to-mouth or object to mouth) for children 1 to < 2 years old as a result of being in an environment that was previously treated with atrazine (e.g., lawns, golf courses, playgrounds, recreational areas, etc). Since dermal and incidental oral exposure routes share a common toxicological endpoint, risk estimates have been combined for those routes for children 1 to < 2 years old. Chemical-specific predicted day-0 turf transferrable residues were adjusted in the post-application assessment for any differences between the study application rate and the registered application rates for atrazine. Then, a 4-day average residue was used to estimate risk from contact with treated turf because the point of departure (POD) is based on decreased LH surge and available toxicity data indicate that the decrease occurs after a 4-day exposure. EPA's assessment of these exposure pathways demonstrated potential post-application risks of concern (i.e., Margins of Exposure (MOEs) below the level of concern (LOC) of 30) for children 1 to <2 years old from combined dermal and incidental oral exposure to residential turf that has been treated with atrazine at the currently labeled maximum application rates for spray applications. For formulations applied as sprays to residential turf, the combined (dermal + incidental oral) MOE for children 1 to < 2 years old is 28 (LOC = 30) at the currently labeled maximum application rate of 2.0 lb ai/A. The combined (dermal + incidental oral) MOE for children 1 to < 2 years old for spray applications on residential turf is 57 (LOC=30) at 1.0 lb ai/A (the maximum application rate for residential turf liquid formulations per the 2004 Memorandum of Agreement for Atrazine (2004 Atrazine MOA))[3], and therefore not of concern[4].

[3] 2004 EPA Memorandum of Agreement Between the U.S. Environmental Protection Agency and Agan Chemical Manufacturing, Dow AgroSciences, Drexel Chemical, Oxon Italia S.P.A., and Syngenta Crop Protection Concerning the Registration of Products Containing Atrazine. 2004.

[4] Although there were no risks from the use of atrazine alone, atrazine, simazine, propazine, and their chlorinated metabolites (DEA, DIA, and DACT) have been determined by the Agency to share a common neuroendocrine mechanism of toxicity. In the cumulative assessment (results summarized below), cumulative risks of concern were identified from the use of granular formulations of atrazine on residential turf at the maximum labeled rates (2.2 lb ai/A). There were no cumulative risks of concern if the granular formulation application rate is reduced from 2.2 lb ai/A to 2.0 lb ai/A.

Non-Occupational Spray Drift Risks

In addition to potential exposure from application directly to residential lawns treated with atrazine, EPA assessed potential human exposure from off-target movement and deposition (i.e., spray drift) of atrazine. There are no bystander spray drift risks of concern for adults or children at the edge of a field treated with atrazine. In addition, there are no expected inhalation risks associated with bystander exposure.

Aggregate Risks

EPA evaluated acute and 4-day aggregate exposure to atrazine and its chlorinated metabolites (DEA, DIA, and DACT), and chronic aggregate exposure to hydroxy metabolites of atrazine. The acute and chronic aggregate assessments include dietary (food-only) and drinking water. The 4-day aggregate assessment includes dietary (food-only), drinking water, and residential exposures.

EPA used a drinking water level of comparison (DWLOC) approach to evaluate aggregate risk. This approach determines acceptable levels of exposure in the total "risk cup" for drinking water, after accounting for exposures from food/residential uses. DWLOCs are then compared to estimated drinking water concentrations (EDWC) to determine whether there are potential aggregate risk concerns once exposure from drinking water is added in. The DWLOC approach is useful when there are multiple EDWCs, as is the case for atrazine or when there are potential aggregate risk estimates of concern.

There were no acute risks of concern for atrazine and its chlorinated metabolites, and no chronic aggregate risks of concern for the hydroxy metabolites of atrazine. For the 4-day aggregate assessment, there are aggregate risks of concern for children at the maximum labeled spray application rate of 2.0 lb ai/A, but no aggregate risks of concern for adults or children from spray applications of atrazine to residential turf at the rate of 1.0 lb ai/A, which is the maximum rate specified for liquid formulations in the 2004 Atrazine MOA.

Cumulative Risks

EPA has determined that atrazine shares a common mechanism of toxicity (neuroendocrine effects in rats that can cause developmental and reproductive toxicity) with the other triazine herbicides, simazine and propazine, and their chlorinated metabolites (DEA, DIA, and DACT). EPA assessed cumulative risk from the triazines and their chlorinated metabolites in the July 10, 2018, *Chlorotriazines: Cumulative Risk Assessment - Atrazine, Propazine, and Simazine*, which is available in the public docket.

There were no risks of concern identified for the chlorotriazine 4-day cumulative dietary (food only) exposure and risk assessment, or for the 4-day dietary cumulative aggregate (food + drinking water) exposure and risk assessment. There were also no cumulative risks of concern for the chronic dietary (food only) or screening-level aggregate (food + drinking water) assessment for the hydroxytriazines.

However, there were some 4-day cumulative aggregate (food + drinking water + residential) exposures that resulted in risks of concern at the maximum labeled rates for atrazine granular formulations (2.2 lbs ai/A) applied to residential turf and at the maximum labeled rates for atrazine spray applications (2.0 lbs ai/A) applied to residential turf for children 1 to < 2 years old.

For atrazine residential turf granular formulations, the cumulative aggregate (food + residential) DWLOC is less than the EDWC of 585 µg/L and therefore is of concern. However, at the rate of 2.0 lbs ai/A for application of atrazine granular products to residential turf, there are no cumulative aggregate risks of concern (DWLOC = 670 µg/L).

In addition, there are cumulative aggregate risks of concern for residential turf spray applications at the maximum labeled rate of 2.0 lb ai/A, but no cumulative aggregate risks of concern for the residential turf spray applications of atrazine at the rate of 1.0 lb ai/A, which is the maximum allowed rate for residential turf liquid formulations specified in the 2004 Atrazine MOA.

Occupational Handler Risks

There is potential for occupational handler risk from combined dermal and inhalation exposure to atrazine. EPA calculated risk estimates based on combined dermal and inhalation exposure for various levels of PPE: at currently label-specified PPE (i.e., long sleeves, pants and socks and chemical resistant gloves), and for scenarios that did not pass at currently label-specified PPE, MOEs were calculated assuming additional PPE or engineering controls (EC) that would be needed to result in risk estimates that are not of concern. The occupational handler scenarios listed below resulted in risk estimates with MOEs ranging from 2.3 to 820 (LOC = 30) assuming label-specified PPE:

- mixing and loading dry flowable/water dispersible granule formulations for aerial application to sorghum, conservation reserve program areas, and fallow;
- mixing and loading dry flowable/water dispersible granule formulations for groundboom applications to sugarcane, sorghum, corn, conservation reserve program areas, and fallow areas via;
- mixing and loading liquid formulations for aerial applications to corn, sorghum, winter weeds, conservation control program areas, fallow areas, and sugarcane;
- mixing and loading liquid formulations for impregnated dry bulk fertilizer application to corn, sorghum, sod, and bioenergy crops;
- mixing and loading water soluble packet formulations for aerial application to guava, sod, corn, sorghum, winter weeds, conservation reserve program areas, fallow areas, and sugarcane;
- applying spray formulations of atrazine via mechanically pressurized handguns to roadsides;
- mixing, loading and applying dry flowable/water dispersible granule, liquid, and water-soluble packet formulations using backpack spray equipment to macadamia nuts, conifers, and landscape turf;
- mixing, loading and applying dry flowable/water dispersible granule, liquid and water-soluble packet formulations using mechanically pressurized handguns to macadamia nuts, sweet corn, and guava; and

- loading and making broadcast spray applications of dry flowable/water dispersible granule, liquid and water-soluble packet formulations to roadsides using backpack spray equipment

Based on EPA's risk assessment, requirement of additional PPE eliminates potential risk for some but not all scenarios. The scenarios for which potential occupational risks of concern remain (*i.e.,* MOEs remain below the LOC of 30) assuming the highest possible level of PPE and/or engineering controls include:

- mixing and loading dry flowable/water dispersible granule formulations for aerial application to sorghum and conservation reserve program areas (MOE = 15 with engineering controls);
- mixing and loading liquid formulations for impregnated dry bulk fertilizer application (MOE = 21 with engineering controls) to corn, sorghum, sod, and bioenergy crops;
- mixing and loading water soluble packets for aerial application to guava (MOE = 26 with engineering controls), sod (MOE = 26 with engineering controls), corn, sorghum, winter weeds, conservation reserve program areas (MOEs = 15 with engineering controls), fallow areas (MOE = 14 with engineering controls), and sugarcane (MOE = 7.7 with engineering controls);
- applying sprays via mechanically pressurized handguns to roadsides (MOE = 7.4 with double layer, gloves and particulate filtering facepiece respirator (PF 10 respirator); EC not applicable);
- mixing, loading and applying dry flowable/water dispersible granule, liquid formulations to landscape turf (MOE = 23 with double layer, gloves and PF 10 respirator; EC not applicable) using backpack spray equipment;
- mixing, loading and applying dry flowable/water dispersible granule, liquid and water soluble packets formulations using mechanically pressurized handguns to macadamia nuts (MOE = 3.8 with double layer, gloves and PF 10 respirator; EC not applicable), sweet corn (MOE = 7.4 with double layer, gloves and PF 10 respirator; EC not applicable), and guava (MOE = 7.4 with double layer, gloves and PF 10 respirator; EC not applicable);
- loading and applying dry flowable/water dispersible granule and liquid formulations to roadsides using backpack spray equipment (MOE = 15 with double layer, gloves and particulate filtering facepiece respirator (PF10); EC not applicable).

The occupational handler exposure assessment relied on maximum registered application rates, generic handler data in absence of chemical-specific unit exposure data, and standard area and amount treated assumptions. Registered atrazine labels vary with respect to required attire and PPE. Liquid, dry flowable/water dispersible granule, and spray formulations were evaluated assuming baseline attire and chemical resistant gloves, the lowest amount of PPE consistently required on all registered labels evaluated, and any additional PPE or mitigation required to result in risk estimates not of concern. Granular formulations were evaluated assuming baseline attire and any additional PPE or mitigation required to result in risk estimates not of concern. WSP formulations were considered an engineering control.

For dry bulk fertilizer scenarios, the assessment assumed closed loading for mixing/loading and open cab spreading. The Agency does not have data regarding the mixing/loading or the

application of atrazine-impregnated dry bulk fertilizer. The mixing/loading processing rate for commercial impregnation of dry bulk fertilizer has been estimated to be 500 tons of fertilizer processed per 8-hour day based on information found on the registered atrazine labels. Application of dry bulk fertilizer was assessed assuming application to up to 320 acres/day for commercial equipment based on information supplied by a registrant related to another pesticide active ingredient, alachlor.

Occupational Post-Application Risks

Based on EPA's draft human health risk assessment which used atrazine-specific dislodgeable foliar residue (DFR) and turf transferable residue (TTR) data, there are no occupational post-application risks of concern for the registered uses of atrazine on the day of application. The occupational post-application MOEs range from 41 to 1,100 (LOC = 30) on the day of application.

2. Human Incidents and Epidemiology

EPA amended and updated its Review of Human Incidents and Epidemiology for the triazine herbicides[5] on November 1, 2017. A search for atrazine was conducted using the following incident databases: OPP Incident Data System (IDS); the National Pesticide Information Center (NPIC); the California Pesticide Illness Surveillance Program (CA PISP); and the Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (CDC/NIOSH) Sentinel Event Notification System for Occupational Risk-Pesticides (SENSOR) databases.

In the current IDS analysis, from January 1, 2012 to January 12, 2017, 84 incidents (29 in Main IDS, and 55 in Aggregate IDS) involving atrazine were reported. Of the 29 incidents in Main IDS, 13 were for atrazine only and the other 16 involved multiple active ingredients. Of the 13 atrazine only incidents, only one was classified as major severity, 11 were classified as moderate severity, and one was minor severity. 54 of the 55 incidents in Aggregate IDS were minor severity, and one had no or unknown effects.

A query of NPIC incidents from 2012 to 2017 found 14 incidents involving atrazine. Of the 14 reported incidents, four were reported as symptomatic and classified as probably or possibly related to atrazine exposure and minor severity. Ten were reported as either inconsistent or unlikely due to atrazine exposure or asymptomatic and unclassifiable.

A query of CA PISP incidents from 2010 to 2014 found no incidents involving atrazine.

A query of SENSOR-Pesticides from 2010-2013 identified 28 cases involving atrazine. The details regarding the reported incidents from the various sources can be found in the 11/1/2017 document. Ten cases involved a single active ingredient and 18 cases involved multiple active ingredients. Three cases were moderate in severity and 25 cases were low in severity.

[5] S. Recore *et. al*., D444041 11/01/2017

Given the low frequency and severity of incidents reported for atrazine, there does not appear to be a concern at this time. The Agency will continue to monitor for atrazine incidents.

The Agricultural Health Study (AHS) findings and epidemiological investigations for atrazine are discussed in *Atrazine: Tier II Epidemiology Report* which is available in the atrazine registration review docket[6] (EPA-HQ-OPP-2013-0266).

3. Tolerances

Tolerances for combined residues of atrazine and its three chlorinated metabolites are established in 40 CFR §180.220.

EPA has reevaluated the tolerances for atrazine and its chlorinated metabolites in/on a variety of crops and livestock commodities and intends to establish, remove, and amend tolerances for the commodities listed in Table 1. Certain tolerances will be amended in accordance with the Organisation for Economic Co-operation and Development (OECD) Rounding Class Practice. In addition, the established tolerance for sweet corn forage will need to be lowered from 15 ppm to 1.5 ppm to reflect current label instructions which require a 45 day pre-harvest interval (PHI) for sweet corn. The Agency also needs to delete and/or establish several new tolerances in accordance with new crop grouping. Finally, a tolerance needs to be established for "Vegetable, foliage of legume, group 7" at 0.5 ppm under 180.220(d) based on rotational crop studies which support the need for this tolerance.

In the PID, the Agency proposed revisions to the tolerances for meat, milk, poultry, and eggs in order to harmonize with Canada's Pest Management Regulatory Agency (PMRA). The proposed revisions were not intended to address a safety issue. However, based on a comment received during the 60-day public comment period from Syngenta Crop Protection, LLC, a technical registrant, explaining that the proposed tolerance changes could create a trade irritant with export countries, including Mexico, the Agency is no longer requiring this revision and the tolerances for livestock commodities will remain at their established levels. For more information, see *Atrazine, Simazine, Propazine: Response to Public Comments on Proposed Interim Decision* available in the public docket.

The U.S. and Canadian residue definitions for atrazine are harmonized for corn grain. Codex has not established atrazine MRLs for any commodity, so harmonization with Codex is not needed.

The Agency has determined that it is necessary to revise the residue definition for the tolerance expression for atrazine be modified to be consistent with current policy on tolerance definitions (S. Knizner, 5/27/2009), to read:

> *"Tolerances are established for residues of the herbicide atrazine, including its metabolites and degradates, in or on the commodities in the table below. Compliance with the tolerance levels specified below is to be determined by measuring only the sum of atrazine,6-chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine, its*

[6] A. Aldridge, D447696, 07/09/2018

metabolites 2-amino-4-chloro-6-isopropylamino-s-triazine, 2-amino-4-chloro-6-ethylamino-s-triazine, and 2,4-diamino-6-chloro-s-triazine, calculated as the stoichiometric equivalent of atrazine, in or on the commodity."

Table 1: Summary of Required Tolerance Revisions for Atrazine (40 CFR §180.220)			
Commodity/ Correct Commodity Definition	**Established Tolerance (ppm)**	**Required Tolerance (ppm)**	**Comments**
40 CFR §180.220(a)			
Corn, field, grain	0.20	0.2	OECD rounding class consistency
Corn, pop, grain	0.20	0.2	
Corn, sweet, forage	15	1.5	Based on field trial data (D272009, C. Eiden, 16-APR-2002)
Corn, sweet, kernel plus cob with husks removed	0.20	0.2	OECD rounding class consistency
Corn, sweet, stover	2.0	2	
Grass, forage	4.0	4	OECD rounding class consistency
Grass, hay	4.0	4	
Nut, macadamia	0.20	0.2	OECD rounding class consistency
Sorghum, grain, grain	0.20	0.2	OECD rounding class consistency
Sorghum, grain, stover	0.50	0.5	
Sugarcane, cane	0.20	0.2	
Wheat, grain	0.10	0.1	
Wheat, hay	5.0	5	
Wheat, straw	0.50	0.5	
40 CFR §180.220(d)			
Arugula	--	0.25	Commodity displaced by the crop group conversion
Celtuce	--	0.25	
Fennel, Florence, fresh leaves and stalk	--	0.25	
Garden cress	--	0.25	
Leaf petiole vegetable subgroup 22B	--	0.25	Crop group conversion/revision
Leafy greens subgroup 4-16A	--	0.25	
Vegetable, leafy, except brassica, group 4	0.25	remove	
Upland cress	--	0.25	Commodity displaced by the crop group conversion
Vegetable, foliage of legume, group 7	--	0.5	Based on field trial data (D391524, W. Donovan, 10-JUL-2018)

In a separate action, EPA will use its Federal Food, Drug, and Cosmetic Act (FFDCA) rulemaking authority to undertake any needed tolerance changes.

4. Human Health Data Needs

The human health risk assessment identified multiresidue method testing results (OCSPP 860.1360) for the chlorinated metabolites of atrazine, desethylatrazine (DEA), desisopropylatrazine (DIA), and diaminochloroatrazine (DACT), as a data deficiency. These data are needed to determine the suitability of multiresidue methodology for quantification of atrazine and its regulated metabolites. On December 12, 2018, the Agency issued a generic data call-in (GDCI) requiring submission of these data; these data are under development and due to the Agency by December 20, 2020.

The agency is moving forward with its registration review decision because this required multiresidue study is needed for greater efficiency of tolerance enforcement and does not impact the safety finding of atrazine.

B. Ecological Risks

The Agency conducted a comprehensive ecological risk assessment for the registered uses of atrazine. Potential risks of concern were identified for mammals, birds, reptiles, amphibians, freshwater and estuarine/marine fish, aquatic invertebrates, terrestrial and aquatic plants, and aquatic plant communities.

Since the publication of the 2016 ecological risk assessment for atrazine, EPA has evaluated new ecological effects and exposure data that was not available at the time that the 2016 risk assessment was completed. Given the schedule by which EPA must publish its ESA draft biological evaluation (BE) for atrazine (fall 2020), it is in that assessment that EPA will more fully integrate the newer data as well as input received during the public comment period for the draft ecological risk assessment.

For additional details on the 2016 ecological assessment for atrazine, see the *Refined Ecological Risk Assessment for Atrazine*, which is available in the public docket (https://beta.regulations.gov/document/EPA-HQ-OPP-2013-0266-0315). For more specific information about the incorporation of newer data, reanalysis and assessment of existing studies, and use of alternate assessment methodologies in the BE, see *Atrazine--Environmental Fate and Effects Division's Response to Public Comments* (https://beta.regulations.gov/document/EPA-HQ-OPP-2013-0266-1267) and *Regulatory Update on the Registration Review of Atrazine* (https://beta.regulations.gov/document/EPA-HQ-OPP-2013-0266-1260), both of which are also available in the atrazine docket.

1. Risk Summary and Characterization

EPA estimated potential exposure and risks associated with atrazine use to non-target birds, mammals, reptiles and amphibians; terrestrial invertebrates, including honeybees and other insect pollinators; and plants. Risk estimates (risk quotients, or RQs) were compared with EPA's LOCs. For ecological risk, RQs below the LOC are not of concern to the Agency. For all taxa in the terrestrial assessment, except for plants, the LOC for acute exposure is 0.5 and the LOC for chronic exposure is 1.0. The LOC for plants is 1.0. In the draft ecological risk assessment, the

Agency identified potential chronic risk concerns for mammals, birds, terrestrial phase amphibians, reptiles, and aquatic invertebrates. The draft risk assessment assessed the maximum-labeled, reduced, and typical application rates.

Terrestrial Risks

Mammals

The ecological risk assessment did not identify acute risks of concern for mammals; however, chronic risk estimates exceed the Agency's LOC of 1 for the majority of scenarios modeled for all uses. Chronic RQs range from 0.1 to 198. The toxicity endpoint is based on reproductive endpoints associated with decreased body weight, body weight gain and food consumption. In addition, chronic LOCs for mammals are exceeded from 25 to 250 feet off the field depending on the maximum application rate.

Birds, Reptiles, and Terrestrial-Phase Amphibians

Acute and chronic LOCs (0.5 for acute exposure and 1 for chronic exposure) are exceeded for birds for many atrazine uses. Birds serve as surrogates for reptiles and terrestrial-phase amphibians in the absence of taxa-specific data. Acute RQs range from <0.01 to 3.41, and chronic RQs range from 0.2 to 23. The adverse effect upon which the acute endpoint is based is mortality, and the chronic endpoint is based on decreased hatchling weight observed in a mallard reproduction study. Higher tier models utilized in the risk assessment also suggest potential risk concerns for sublethal effects on birds, which occur at lower exposures than levels where acute (mortality) effects were seen

EPA's Terrestrial Herpetofaunal Exposure Residue Program Simulation (T-HERPS) model was used to provide refined EECs and RQs for reptiles and terrestrial phase amphibians using bird toxicity data. Chronic RQ values exceeded the Agency's LOC, with RQs ranging from 1.2 to 22.6.

Terrestrial Invertebrates (honeybees)

Available acute contact toxicity data indicate that atrazine is practically non-toxic to adult bees on an acute oral exposure basis. Additionally, the calculated RQ of 0.11 is below the Agency's LOC of 0.4 for acute exposure. However, there is uncertainty about potential risks to terrestrial invertebrates because a full tier 1 suite of terrestrial invertebrate toxicity studies is not available at this time.

Additional data may be necessary to fully evaluate risks to non-target terrestrial invertebrates, especially pollinators. No data needs (including pollinator) were identified in the atrazine problem formulation (PF) or the FWP. However, the atrazine PF and FWP were completed prior to EPA's issuance of the June 2014 *Guidance for Assessing Pesticide Risks to Bees*[7]. This 2014

[7] Available at https://www.epa.gov/sites/production/files/2014-06/documents/pollinator_risk_assessment_guidance_06_19_14.pdf

guidance lists pollinator studies that were not included in the atrazine registration review DCI. Therefore, the Agency is currently determining whether additional pollinator data are needed for atrazine. If the Agency determines that additional pollinator exposure and effects data are necessary to help make a final registration review decision for atrazine, then EPA will issue a DCI to obtain these data. The pollinator studies that could be required are listed in Table 2 below and based on EPA's June 2014 *Guidance for Assessing Pesticide Risks to Bees.*

Table 2: Potential Pollinator Data Requirements	
Guideline #	**Study**
Tier 1	
850.3020	Acute contact toxicity study with adult honey bees
850.3030	Honey bee toxicity of residues on foliage
Non-Guideline (OECD 213)	Honey bee adult acute oral toxicity
Non-Guideline (OECD 237)	Honey bee larvae acute oral toxicity
Non-Guideline	Honey bee adult chronic oral toxicity
Non-Guideline	Honey bee larvae chronic oral toxicity
Tier 2†	
Non-Guideline	Field trial of residues in pollen and nectar
Non-Guideline (OECD 75)	Semi-field testing for pollinators
Tier 3†	
850.3040	Full-Field testing for pollinators

† The need for higher tier tests for pollinators will be determined based upon the results of lower tiered tests and/or other lines of evidence and the need for a refined pollinator risk assessment.

Terrestrial Plants

Consistent with its herbicidal mode of action, atrazine is highly toxic to monocot and dicot terrestrial plant species. Non-target terrestrial plants species in areas adjacent to treated fields are likely to be impacted by exposure to atrazine. At the maximum single application rate, RQs associated with exposure via spray drift, as well as the combination of runoff and spray drift exposure to dry areas and semi-aquatic habitats exceed the LOC of 1.0. RQs for spray drift-only exposure range from 2.5 to 67, RQs for runoff and spray drift deposition to dry areas range from 7.5 to 93, and RQs for runoff and spray drift deposition to semi-aquatic areas range from 53 to 333. RQs resulting from ground spray applications result in lower potential drift concerns than those resulting from aerial applications; however, these, applications contribute equally to potential runoff concerns. The adverse effect endpoint is based on impacts to seedling emergence.

For characterization, EPA evaluated potential risks to terrestrial plants at reduced application rates and developed species vegetative vigor and seedling emergence sensitivity distributions (SSDs), however RQs still exceed the LOC for terrestrial plants.

Aquatic Risks

Aquatic-Phase Amphibians

EPA conducted a Weight of Evidence (WoE) analysis of the available literature on effects of atrazine to amphibians based on feedback from the 2012 Science Advisory Panel. The WoE analysis concluded that there is potential risk to amphibians because there is significant overlap of multiple effects endpoints and the EECs estimated with the modeling, as well as surface water monitoring results. Due to the variability in the reported amphibian endpoints, establishment of a definitive, quantitative RQ values were not calculated.

Freshwater and Estuarine/Marine Fish

EPA's chronic LOC of 1 is exceeded for freshwater and estuarine fish through runoff and spray drift deposition into waterways following labeled applications for all registered atrazine uses, with RQs ranging from 0.94 to 61. The chronic fish endpoint is based on decreased egg production in the freshwater Japanese medaka fish.

Aquatic Invertebrates

The ecological risk assessment did not identify acute risks of concern for freshwater invertebrates; however, chronic risk estimates exceed the Agency's LOC of 1, with RQs ranging from 0.5 to 3.3. For estuarine/marine invertebrates, acute and chronic risk estimates exceed LOCs, with RQs ranging from 0.5 to 4.3 (acute) and 6.2 to 52 (chronic). The acute effects endpoint is based on mortality. The chronic effects endpoint is based on observed reduction in growth and survival, with juvenile estuarine/marine shrimp being the most sensitive aquatic invertebrate tested.

Aquatic Vascular and Non-Vascular Plants

Risk estimates exceed the Agency's LOC for aquatic vascular and non-vascular plants for all uses, rates, and scenarios including refinements such as reduced application rates and soil incorporation. RQs range from 1.1 to 68.7 for vascular plants, and 5.2 to 316 for non-vascular plants. The effects endpoint is based on reductions in chlorophyll production.

Aquatic Plant Communities

In addition to evaluating the effects to aquatic plants for individual species, EPA evaluated the toxicity of atrazine to aquatic plant communities as a whole. Evaluation of aquatic plant communities includes the determination of whether atrazine concentrations in watersheds cause significant changes in structure, function, and productivity of that community that could potentially impact the food chain and ecosystem integrity. The focus on toxicity to the aquatic plant community is necessary to determine whether atrazine concentrations in watersheds are likely to cause significant changes in the overall aquatic plant community that would impact the food chain (e.g., reducing food for fish, invertebrates, and birds) and ecosystem integrity (e.g., erosion control and animal habitat). In this approach, single-species plant toxicity data and

microcosm/mesocosm (cosm) studies have been used to determine what atrazine exposure patterns and concentrations that are likely to change the productivity, structure, and/or function of aquatic plant communities. From these data, a level of concern was developed, which, together with monitoring data, is used to identify watersheds where atrazine levels pose a concern for these communities. This level of concern is referred to as the Concentration Equivalent Level of Concern (CE-LOC). The level can be compared to 60-day average concentrations of atrazine to identify watersheds that warrant further attention.

In response to significant public comments, concerns, and inherent uncertainty related to the data, assumptions, and interpretations used to arrive at the aquatic plant CE-LOC in the 2016 draft atrazine ecological risk assessment, EPA has considered alternate approaches for inclusion, evaluating/scoring, and interpretation of the atrazine ecosystem and related studies. The Agency acknowledges that differences in the interpretation of effects, scoring methodology, and splitting of functional groups can greatly influence the resulting CE-LOC. There are also sources of uncertainty inherent in the models used to calculate the CE-LOC. Utilizing the cosm scoring and study exclusions recommended by the 2012 SAP and accounting for model sources of uncertainty, the resulting CE-LOC ranges from 1.9 to 26 µg/L with a median of 8.5 µg/L. The range of values are presented in table, below.

Table 3: Description of the distribution of CELOC values (µg/L) based on SAP recommendations considering model uncertainties	
	CELOC incorporating SAP suggestions on 11 cosm studies
Median	8.5
5th Percentile	4.6
25th Percentile	6.7
75th Percentile	10.9
95th Percentile	15.7
Range	1.9 to 26

Given the complex nature of mesocosm and microcosm studies, the various protocols used in the conduct of these studies, the model uncertainty described in the 2016 risk assessment, the recommendation of the SAP, the potential for recovery of the aquatic plant community following exposure, and the high agricultural benefits provided by atrazine, the Agency considers it appropriate to present a range of concentrations that accounts for these factors for risk management purposes under Registration Review.

In view of the range of 1.9 to 26 µg/L presented in Table 1, the Agency believes it is reasonable to focus on the upper end of the range as recovery is more likely at lower concentrations. For the purposes of determining the need for any potential mitigation to protect aquatic plant communities during Registration Review, EPA will use the concentration of 15 µg/L as a 60-day average, which is at the upper end of the distribution of values presented in Table 1.

For more details about EPA's decision to use the concentration of 15 µg/L as a 60-day average for the purposes of determining the need for any potential mitigation to protect aquatic plant communities during Registration Review, please see the *Regulatory Update on the Registration Review of Atrazine* (October 21, 2019) in the atrazine docket (EPA-HQ-OPP-2013-0266).

2. Ecological Incidents

As part of the refined ecological risk assessment, the Ecological Incident Information System (EIIS) and the Avian Incident Monitoring System (AIMS) were searched for incidents of adverse effects to wildlife, fish, invertebrates, and plants resulting from exposure to atrazine since the registration of atrazine through May 2015. This search was updated to reflect incidents through August 2020.

Since the registration of atrazine in 1970 there have been 916 incidents, mostly involving damage to terrestrial plants. However, 48 involved aquatic animals and 20 involved terrestrial animals. There were 25 incidents associated with aquatic or terrestrial animal kills. The presence of atrazine in water at levels high enough to cause effects was confirmed in 3 aquatic incidents, and there were 14 incidents in which atrazine's presence in water was not confirmed, but the timing of application correlated with the incident. In addition, 421 aggregate incidents have been reported to the Agency through IDS with dates ranging from 1995 to 2020. The AIMS database included 3 reports of bird incidents involving atrazine, which are already captured in the IDS database.

The Agency will continue to monitor ecological incident information as it is reported to the Agency. Detailed analyses of these incidents are conducted if reported information indicates concerns for risk to non-target organisms.

C. Benefits Assessment

Atrazine is a chlorinated triazine herbicide and is classified as a Weed Science Society of America (WSSA) Group 5 herbicide. Atrazine is applied before or after the crop emerges (or, pre or post emergence) to prevent weeds from emerging and to control some small, emerged broadleaf and grass weeds. Atrazine is an important herbicide for warm-season grass crops, such as corn, sorghum, and sugarcane, because it is economical, has a flexible use pattern, has a long residual period, has good crop safety, and is highly effective against a broad spectrum of weeds. There are also similar benefits of atrazine in non-agricultural sites, e.g. turfgrass and nurseries/ornamentals.

FIELD CORN

On average, approximately 58% of field corn or 53.3 million acres are treated with 62.3 million pounds of atrazine per year. Corn acres in the Corn Belt (Illinois, Indiana, Iowa, Missouri, and Ohio) and the Northern Plains (Colorado, Nebraska, North Dakota, South Dakota) account for about 67% of atrazine usage in the United States. The majority of atrazine is applied before crop emergence (66%) and 99% is applied by ground equipment. On average, corn growers made 1.2 applications of atrazine per year, with the average single application rate of 0.95 pounds active ingredient per acre (lbs. a.i./acre).

If atrazine were not available to corn growers, pest control alternatives would vary by region, application timing and pest pressure. In the Corn Belt, likely alternatives include saflufenacil followed by a later application of 2,4-D, which is more than three times as expensive as a single

application of atrazine. Applications after crop emergence may include a single application of tembotrione or a co-application of flumetsulam with acetochlor and halosulfuron. These options could increase costs three to seven times more than a single application of atrazine. Losses for the Corn Belt could range from $8 to $20 per acre or 4% to 9% of grower net operating revenue.

Similarly, in the Plains States, mesotrione alone or with saflufenacil could be used before crop emergence and is nearly three to six times more expensive than atrazine per acre. Post-emergent alternatives could include mesotrione with primisulfuron and cost six times as much per acre. For the Plains States, potential losses of $9 to $16 per acre or 17% to 32% of net operating revenue.

In the Southern States (Alabama, Delaware, Georgia, Maryland, North Carolina, South Carolina, Virginia, Arkansas, Louisiana, Mississippi, Tennessee), alternatives could include simazine or flumetsulam plus dimethenamid prior to crop emergence followed by an application of dicamba, with control costs being slightly more to more than double the cost of a single atrazine application. For post-emergent control in the Southern States, likely alternatives include ametryn and linuron, which could increase control costs by up to three times. Regionally, the Southern corn growing states could see the greatest impacts if atrazine is not available to growers. Losses to grower net operating revenue could range from $1 to $43 per acre or from 1% to as high as 40% of net operating revenues factoring in alternative costs and poor pest control resulting in potential yield loss.

For more information refer to *Atrazine and Simazine Use on Field Corn: Response to comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)* in the docket.

SORGHUM

On average, approximately 68% of sorghum acres, or 7 million acres, are treated with 6.4 million pounds of atrazine annually. Nationally, sorghum growers apply atrazine aerially on 77,200 acres (1.1% of atrazine treated acres) annually and nearly 99% is applied by ground equipment. Approximately 69% of atrazine is applied before crop emergence. On average, 40% sorghum acres are treated twice, with the average single application rate of 0.913 lbs. a.i./acre.

In the absence of atrazine, applications of mesotrione before crop emergence would likely provide similar level of weed control as atrazine. However, mesotrione is nearly two and a half times more expensive than atrazine, and grower net operating revenue would decrease 33% from $24/acre to $16/acre. If a postemergence application is required, growers would likely use prosulfuron at a $5/acre premium, further reducing net operating revenue to $11/acre, or a 54% loss. If a follow-up treatment is necessary to catch any emerging weeds, then dicamba would likely be used at an extra cost of $3/acre, further reducing grower net operating revenue to $8/acre, or a 67% loss.

For more information refer to *Atrazine and Propazine Use on Grain Sorghum and Fallow Areas: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080808)* in the docket.

SUGARCANE

Nearly all of the Florida sugarcane crop and about one-third of the Louisiana sugarcane crop are treated with atrazine. On average, two atrazine applications in Florida and one application in Louisiana are made in a year. In the absence of atrazine, Florida growers would likely apply one application of metribuzin followed by one application of ametryn or one application of metribuzin and one application of mesotrione. The cost increases from using these alternative weed control scenarios range from $5/acre to $11/acre, which represents a decrease of approximately 2 to 4% in grower net operating revenue. For Louisiana, growers would likely replace atrazine with an application of metribuzin or mesotrione resulting in an increase in cost of $8 to $13 per acre, which represents approximately 11 to 17% of grower net operating revenue.

For more information refer to *Atrazine in Sugarcane: Usage, Benefits, Impacts of Potential Mitigation, and Response to Comments; PC Code (080803)* in the docket.

SWEET CORN

On average, approximately 75% of sweet corn or 368,000 acres are treated with 303,000 pounds of atrazine. Growers in the North Central / Northeastern region account for a large percentage of atrazine usage (56%). Approximately two-thirds of atrazine is applied before crop emergence and 99% is applied by ground equipment.

In the absence of atrazine, farmers would likely apply a mix of herbicides, which would differ by region and by application timing. In the North Central / Northeast region, triazines may be replaced prior to crop emergence with mesotrione or simazine, which would increase herbicide costs by between $2 and $13 (a decrease in net operating revenue of 5-32% acre). In the Northwest, atrazine may be replaced with topramezone after crop emergence, which would increase herbicide costs by $13 per acre (a 32% decrease in net operating revenue). In the Southeast, either simazine or s-metolachlor and mesotrione could replace atrazine prior to or after crop emergence, which would increase herbicide costs by $2 and $27 per acre (equivalent to a net revenue decrease of 5-66%). Depending on whether the alternatives provide adequate weed control, growers in the Southeast may need to follow-up with herbicide applications that target emerged weeds, which could cost an additional $2 to $8 per acre, depending on the active ingredient selected.

Additionally, there may be yield losses if the level of pest control produced by atrazine cannot be achieved with an alternate selection of herbicides; assuming an 8% yield loss and constant prices, this could lead to a further decrease in gross revenue of up to $138 per acre. Yield loss is more likely in the Southeast due to the greater variety of pest pressure and lack of alternative active ingredients to target those pests.

For more information refer to *Atrazine and Simazine Use on Sweet Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)* in the docket.

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FALLOW

For fallow systems to be successful, it is important to have a weed-free field so that weeds are not using water and that water is available for the crop planted the following year. Herbicides with residual activity, like atrazine, are important for this system because residual herbicides prevent weeds from emerging. Atrazine is the leading residual herbicide in fallow systems. On average, about 3% of fallow acres (1,140,800 acres) that receive herbicide applications are treated with atrazine. The average application rate is 0.867 lbs. a.i./acre. Of the acres treated with atrazine, less than 10,000 acres are treated aerially per year. The remaining applications are applied by ground. The majority of atrazine applications are made with liquid formulations.

For more information refer to *Atrazine and Propazine Use on Grain Sorghum and Fallow Areas: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080808)* in the docket.

TURFGRASS AND NURSERIES/ORNAMENTALS

Atrazine is effective, inexpensive, and requires little additional management input because its effectiveness and optimum timing are well understood after decades of usage by applicators in turfgrass and nursery/ornamental use sites. Atrazine was one of the top five herbicides used in terms of pounds applied in nursery/ornamental use sites. Atrazine is used to control annual grass and broadleaf weeds, both pre and post-emergence in these sites.

Turfgrass use of atrazine includes institutional uses (e.g., cemeteries, parks, and schools), golf courses, and residential lawns. Atrazine can only be used on warm season turfgrass species without causing turf injury. Warm season species can be grown in the warm season region and the transition zone region of the United States. The turf category is the largest non-agricultural use in terms of pounds of atrazine used. Atrazine targets some of the top weeds in turf farms/sod with the cheapest price range (in terms of cost per acre for typical product rates) relative to other herbicides. Atrazine was estimated to be one of the top five herbicides impregnated on lawn fertilizers for use as a weed and feed product in the consumer/homeowner market. The Golf Course Superintendents Association of America said that atrazine was used at rates of 1.0 to 1.5 lbs ai/acre and the National Association of Landscape Professionals (institutional and home turf) said that their members use atrazine at 1.0 lb ai/acre.

For more information refer to *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits; PC Codes (080803 and 080807)* in the docket.

IV. INTERIM REGISTRATION REVIEW DECISION

A. Risk Mitigation and Regulatory Rationale

EPA has identified potential human health risks of concern from cumulative aggregate exposure (food + drinking water + residential) associated with use of granular-formulated atrazine products on residential turf, and to occupational handlers mixing, loading and applying atrazine for various use scenarios. In addition, atrazine use poses potential ecological risks to mammals,

birds, reptiles, amphibians, fish, aquatic invertebrates, terrestrial plants, and aquatic plant communities.

The Agency has reviewed the risks, benefits, and uses of atrazine and has determined that risk mitigation is necessary. For information about the potential impacts of the necessary mitigation, please refer to Section IV. C. *Expected Impacts of Necessary Mitigation*.

To mitigate potential cumulative aggregate (food + drinking water + residential), risk concerns associated with the use of atrazine granular and spray formulations on residential turf, EPA has determined that it is necessary to reduce the maximum single application rate of atrazine on residential turf from 2.2 to 2.0 lbs ai/A for granular formulations and from 2.0 to 1.0 lbs ai/A for spray formulations. The 2004 Atrazine MOA already specifies a maximum single application rate of 1.0 lb ai/A for residential turf liquid formulations; the necessary mitigation expands upon this to include all spray and granular formulations for residential turf.

The following mitigation is necessary to address potential occupational handler risk concerns identified for various atrazine use scenarios:

- additional PPE and engineering controls for certain uses (see below for more details);
- restrict aerial applications to liquid formulations only and prohibit all other product formulation types (e.g., DF/WDG, WSP) from being applied by airplane or helicopter;
- restrict the impregnation of dry bulk commercial fertilizer to 340 tons per worker per day for no more than 30 days per calendar year for use on corn, sorghum, bioenergy, and sod;
- restrict landscape turf application via backpack sprayer to spot treatments rather than broadcast spray;
- prohibit application via mechanically pressurized handgun for macadamia nuts, sweet corn, and guava; and
- remove roadside uses from all atrazine product labels.

EPA identified potential risks of concern to mammals, birds, reptiles, amphibians, fish, aquatic invertebrates, terrestrial plants, and aquatic plant communities from the use of atrazine. The Agency weighed the benefits against the potential ecological risks and determined that mandatory spray drift language is necessary to reduce ecological exposure of atrazine in the environment. In addition, EPA has determined that product stewardship measures are necessary. These measures would be implemented by the atrazine technical registrants as part of a nation-wide atrazine stewardship program to ensure proper use of atrazine products. Collectively, these mitigation measures and stewardship measures are expected to reduce overall ecological exposure and potential risk to non-target species.

In evaluating potential risk mitigation for atrazine, EPA considered the risks, the benefits, and the use pattern. Although there are potential risks of concern associated with the use of atrazine, with the adoption of the mitigation measures discussed in this section, EPA determined that with this reduction in exposure any remaining potential worker and/or ecological risks are outweighed by the benefits associated with use of atrazine (i.e., important herbicide for warm-season grass crops including corn, sorghum, and sugarcane; it is economical; has a flexible use pattern; has a long residual period; good crop safety; and is highly effective against a broad spectrum of weeds.

There are also similar benefits of atrazine in non-agricultural sites e.g., turfgrass and nurseries/ornamentals).

EPA also determined that label changes to address herbicide resistance management, as well as other general labeling requirements for all atrazine products and uses, are needed. The necessary label changes include but are not limited to, updated glove and respirator label language, a non-target organism advisory, and standardized label directions for mixing/loading water-soluble packages, etc. For more information see Section IV.A.6. *Additional Required Label Changes*.

1. Residential Turf Rate Reduction

The human health chlorotriazine cumulative aggregate (food + drinking water + residential) risk assessment identified potential risks of concern for atrazine granular and spray use on residential turf. To mitigate potential cumulative aggregate risks of concern associated with atrazine granular residential turf use, the Agency determined that it is necessary to reduce the maximum single application rate from 2.2 lbs ai/A to 2.0 lbs ai/A. To mitigate potential cumulative aggregate risks of concern associated with spray applications of atrazine to residential turf use, the Agency determined that it is necessary to reduce the maximum single application rate from 2.0 lbs ai/A to 1.0 lbs ai/A, which is the maximum rate that is specified in the 2004 Atrazine MOA for liquid formulations to residential turf. There are no cumulative aggregate risks of concern if the residential turf maximum single application rates are reduced to 2.0 lbs ai/A for atrazine granular formulations and 1.0 lb ai/A for spray applications.

2. Occupational Handler Risk Mitigation for Various Use Scenarios

Additional Personal Protective Equipment (PPE)

Some use scenarios result in occupational handler risks of concern for workers who mix, load, and/or apply atrazine at currently label-specified PPE. The Agency has determined that additional PPE eliminates potential risk for some but not all scenarios. The following scenarios are fully mitigated with the addition of PPE, and therefore, the Agency has determined that additional PPE is necessary for these scenarios:

To address potential mixer/loader risks, the following mitigation is necessary:

- Particulate Filtering Facepiece (in addition to currently labeled specified PPE of single layer clothing and gloves) for dry-flowable/water dispersible (DF/WDG) granular formulations for groundboom applications to corn, sorghum, conservation reserve program areas, fallow, and sugarcane. For uses covered by the Worker Protection Standard[8] (WPS) the associated respirator fit test, training, and medical evaluation will be needed. See *Respirator Requirement for Handlers* below for more information.

[8] 40 CFR 170

- Engineering Controls (e.g., closed mixing/loading system) for liquids for aerial applications to corn, sorghum, winter weed control, conservation reserve program areas, fallow, and sugarcane.

To address potential mixer/loader/applicator risks, the following mitigation is necessary:

- Double Layer and Gloves for DF/WDG and water-soluble package (WSP) backpack spray applications to macadamia nuts and conifers

Respirator for Atrazine Handlers

As mentioned above, to mitigate potential inhalation risk to occupational handlers, the Agency has determined that a respirator is necessary for certain uses and, for those pesticide uses covered by the Worker Protection Standard[8] (WPS), the associated fit test, training, and medical evaluation is required for the following:

- (Mixer/Loader) DF/WDG formulations for groundboom application to corn, sorghum, conservation reserve program areas, fallow, and sugarcane

EPA has recently required fit testing, training, and medical evaluations[9] for all handlers who are required to wear respirators and whose work falls within the scope of the WPS.[10] If an atrazine handler currently does not have a respirator, an additional cost will be incurred by the handler or the handler's employer, which includes the cost of the respirator plus, for WPS-covered products, the cost for a respirator fit test, training, and medical exam.

Respirator fit tests are currently required by the Occupational Safety and Health Administration (OSHA) for other occupational settings to ensure proper protection.[11]

EPA acknowledges that requiring a respirator and the associated fit testing, training, and medical evaluation places a burden on handlers or employers. However, the proper fit and use of respirators is essential to accomplish the protections respirators are intended to provide. In estimating the inhalation risks, and the risk reduction associated with different respirators, EPA's human health risk assessments assume National Institute for Occupational Safety and Health (NIOSH) protection factors (*i.e.*, respirators are used according to OSHA's standards). If the respirator does not fit properly, use of atrazine may cause unreasonable adverse effects on the pesticide handler.

Restrict Aerial Application to Liquid Formulations Only / Prohibit Aerial Application of All Other Formulation Types

To address potential mixer/loader risks associated with DF/WDG and WSP formulations for aerial application to corn, sorghum, conservation reserve programs, winter weed control, guava, sod, fallow and sugarcane, EPA determined that it is necessary to restrict aerial application to

[9] Fit testing, training, and medical evaluations must be conducted according to OSHA regulations 29 CFR § 1910.134, 29 CFR § 1910.134(k)(1)(i) through(vi), and 29 CFR § 1910.134, respectively.
[10] 40 CFR 170 (see also Appendix A of Chapter 10 of the Label Review Manual, available at https://www.epa.gov/pesticide-registration/label-review-manual)[11] 29 CFR § 1910.134
[11] 29 CFR § 1910.134

liquid formulations across all registered uses. In other words, except for liquid formulations, EPA is prohibiting aerial application for products with all other formulation categories, such as DF/WDG and WSP.

Engineering Controls for Liquid Formulations Applied by Air at Rates Equal to or Greater than 2 lbs ai/A

To address potential mixer/loader risks, EPA has determined that it is necessary to use closed mixing/loading transfer systems (engineering controls) of liquid formulations for all uses applied by air with maximum single application rates equal to or greater than 2 lbs ai/A. This will mitigate risks identified for corn, sorghum, conservation reserve programs, winter weed control, fallow, and sugarcane.

Restrict Amount of Atrazine to be Impregnated into Dry Bulk Fertilizer per Worker per Day

In order to address potential mixer/loader risk for liquids for impregnated dry bulk fertilizer application (commercial), EPA has determined that it is necessary to restrict the impregnation of dry bulk fertilizer for use on corn, sorghum, bioenergy, and sod to 340 tons per worker per day for no more than 30 days per calendar year.

Restrict Landscape Turf Application via Backpack Spray to Spot Treatment + Require Additional PPE

In order to address potential mixer/loader/applicator risk associated with broadcast backpack spray application of atrazine to landscape turf, EPA has determined that it is necessary to restrict landscape turf application via backpack spray to spot treatments only and require double layer and gloves. In addition, per the 2004 Atrazine MOA, labels must be amended to reduce the maximum single application rate from 2.0 lb ai/A to 1.0 lb ai/A for residential turf liquid formulations.

Prohibition of Mechanically Pressurized Handgun Application to Certain Crops

To address potential mixer/loader/applicator risk when applying atrazine to macadamia nuts, sweet corn, and guava via mechanically pressurized handgun, EPA is prohibiting mechanically pressurized handgun application to these crops.

Delete Roadside Use from all Atrazine Product Labels

The technical registrants requested to voluntarily delete roadsides as an approved use site from all atrazine product labels. The deletion of this use site mitigates potential risk to loaders and applicators when applying dry flowable/water dispersible granules and liquid formulations via backpack sprayer to roadsides, and to applicators when applying spray formulations of atrazine via mechanically pressurized handguns to roadsides.

3. Spray Drift Managment

The Agency has determined that label changes are necessary to reduce off-target spray drift and establish a baseline level of protection against spray drift that is consistent across all atrazine products. Reducing spray drift is expected to reduce the extent of environmental exposure and risk to non-target plants and animals, including listed species whose range and/or critical habitat co-occur with the use of atrazine. These spray drift reduction measures will be considered in forthcoming consultation with the Services, as appropriate. Although the Agency is not making a complete endangered species finding at this time, these label changes are expected to reduce the extent of exposure and may reduce risk to listed species whose range and/or critical habitat co-occur with the use of atrazine.

The Agency has determined that it is necessary to include the following spray drift mitigation language on all atrazine product labels for products applied by liquid spray application. The necessary spray drift language is intended to consist of mandatory, enforceable statements and supersedes any existing language already on product labels (either advisory or mandatory) covering the same topics. In addition to mandatory mitigation language, the Agency has determined that it is necessary to standardize all advisory language across atrazine product labels. Registrants must ensure that any existing advisory language left on labels does not contradict or modify the new mandatory spray drift statements required in this ID, once effective.

- Applicators must not apply during temperature inversions.
- For aerial applications, do not apply when wind speeds exceed 15 mph at the application site. If the windspeed is greater than 10 mph, the boom length must be 65% or less of the wingspan for fixed wing aircraft and 75% or less of the rotor diameter for helicopters. Otherwise, the boom length must be 75% or less of the wingspan for fixed-wing aircraft and 90% or less of the rotor diameter for helicopters.
- For aerial applications, if the windspeed is 10 miles per hour or less, applicators must use ½ swath displacement upwind at the downwind edge of the field. When the windspeed is between 11-15 miles per hour, applicators must use ¾ swath displacement upwind at the downwind edge of the field.
- For aerial applications, the release height must be no higher than 10 feet from the top of the crop canopy or ground, unless a greater application height is required for pilot safety.
- For groundboom applications, do not apply when wind speeds exceed 15 mph at the application site.
- For ground boom applications, apply with the release height no more than 4 feet above the ground or crop canopy.
- For ground and/or aerial applications, select nozzle and pressure that deliver medium or courser droplets as indicated in nozzle manufacturers' catalogues and in accordance with the most recent version of American Society of Agricultural & Biological Engineers Standard 572 and 641, respectively (ASABE S572 and S641).

In addition to including the spray drift restrictions on atrazine labels, all references to volumetric mean diameter (VMD) information for spray droplets must be removed from all atrazine labels

where such information currently appears. The new language above, which cites ASABE S572, eliminates the need for VMD information.

4. Non-target Advisory

EPA determined that a non-target organism advisory is necessary label language for atrazine. The protection of pollinating organisms is a priority for the Agency. Atrazine may negatively impact forage and habitat of pollinators and other non-target organisms. It is the Agency's goal to reduce spray drift whenever possible and to educate growers on the potential for indirect effects on the forage and habitat of pollinators and other non-target organisms. Therefore, EPA determined that a non-target organism advisory is necessary on atrazine labels to address this potential concern.

5. Herbicide Resistance Management

On August 24, 2017, EPA finalized a Pesticide Registration Notice (PRN) on herbicide resistance management.[12] Consistent with the Notice, EPA has determined that it is necessary to implement herbicide resistance measures for existing chemicals during registration review, and for new chemicals and new uses at the time of registration. In registration review, herbicide resistance elements will be included in every herbicide ID.

The development and spread of herbicide-resistant weeds in agriculture is a widespread problem that has the potential to fundamentally change production practices in U.S. agriculture. While herbicide-resistant weeds have been known since the 1950s, the number of species and their geographical extent, has been increasing rapidly. Currently there are over 250 weed species worldwide with confirmed herbicide resistance. In the United States, there are over 155 weed species with confirmed resistance to one or more herbicides.

Management of herbicide-resistant weeds, both in mitigating established herbicide-resistant weeds and in slowing or preventing the development of new herbicide resistant weeds, is a complex problem without a simple solution. Coordinated efforts of growers, agricultural extension, academic researcher, scientific societies, pesticide registrants, and state and federal agencies are required to address this problem.

EPA has determined that measures for the pesticide registrants to provide growers and users with detailed information and recommendations to slow the development and spread of herbicide-resistant weeds are necessary. This is part of a more holistic, proactive approach recommended by crop consultants, commodity organizations, professional/scientific societies, researchers, and the registrants themselves.

[12] PRN 2017-2, "Guidance for Herbicide Resistance Management Labeling, Education, Training, and Stewardship". Available at https://www.epa.gov/pesticide-registration/pesticide-registration-notices-year

6. Additional Necessary Label Changes

In addition to the above-mentioned necessary mitigation, EPA has determined that the following label changes are necessary to address generic labeling requirements for all atrazine products and uses:

- *Label Statement Prohibiting Application of Atrazine and Propazine Products to the Same Sorghum Acre*: EPA has determined that the addition of a statement to the application rate tables and "Directions for Use" sections of atrazine product labels prohibiting the application of atrazine and propazine products to the same sorghum acre is necessary. This is not a new requirement and is already on some labels, but placement is not uniform across labels and may not be apparent to users. The Agency thinks that users frequently use rate tables; therefore, these changes are intended to make labels clearer for applicators. See Appendix B.

- *Updated Glove and Respirator Label Language*: The Agency has determined that an update to the glove and respirator statements currently on labels is necessary to be consistent with the Label Review Manual[13]. The new glove and respirator language do not fundamentally change the personal protective equipment that workers need to use, and therefore should impose no impacts on users. For gloves, all statements that refer to the chemical resistance category selection chart must be removed from atrazine labels as they might cause confusion for users. These statements must be replaced with specific chemical-resistant glove types, as appropriate. See Appendix B.

- *Directions for Mixing/Loading Water Soluble Packages (WPS) Label Language*: see Appendix B.

7. Atrazine Stewardship Program

In addition to the necessary mitigation measures outlined above, EPA has determined that it is necessary that an atrazine stewardship program be implemented by the technical registrants on a nation-wide scale to highlight the proper use and handling of atrazine products. EPA has determined that the stewardship program should consist of educational and informational materials to be distributed to users at the point of sale of atrazine products, as well as being made available on the internet. Information s that is necessary includes information on atrazine label education, weed resistance management, vulnerable watersheds, and atrazine product knowledge.

B. Status of Atrazine Water Monitoring Programs

Two atrazine water monitoring programs, the Atrazine Monitoring Program (AMP) and the Atrazine Ecological Exposure Monitoring Program (AEEMP), were required through a 2004 Generic Data Call-In (GDCI-080803-20871) and the 2003 Atrazine Interim Reregistration Decision (IRED). The technical registrants agreed to conduct the AMP and AEEMP water

[13] https://www.epa.gov/pesticide-registration/label-review-manual

monitoring programs through the 2004 Atrazine MOA[14]. The AMP monitors community drinking water systems (CWS), primarily in the midwest United States in areas of high atrazine use, to assesses atrazine levels in surface drinking water sources. The AMP is conducted in conjunction with a similar monitoring program for simazine. The AEEMP assesses atrazine levels in streams in watersheds that are exposed to atrazine runoff from corn and sorghum production (small streams, high atrazine use areas, and vulnerable soils).

EPA recognizes that the totality of available triazine monitoring data, including data collected through the atrazine AMP and the AEEMP, is robust and comprehensive. The availability of robust monitoring data enabled EPA to refine and characterize its draft human health and ecological risk assessments. While having monitoring data specific to community water systems is useful, given the conclusions of the 2018 draft triazine human health risk assessments, EPA is discontinuing the requirement for atrazine drinking water monitoring (the AMP). Model-estimated atrazine concentrations, as well as measured concentrations for community water systems are well below the drinking water level of concern (DWLOC). The vast majority of atrazine samples from the AMP show concentrations below 1 ppb, while the highest atrazine concentration ever measured was 227 ppb, which is well below the triazine DWLOC of 580 ppb. Therefore, the Agency does not see value in continuation of the AMP. For these reasons, EPA suspended the requirements for the AMP for calendar year 2020 during which time the Agency solicited comments (during the 60-day comment period for the PID) about the proposal to end the requirement for the AMP. The Agency did not receive significant comments that illustrated a continued need for monitoring through this program and therefore the Agency will end the requirement for the AMP.

Regarding the AEEMP program, EPA's draft ecological risk assessment identified potential ecological risks from surface water exposure (i.e., estimated and measured concentrations) and has continued to show atrazine concentrations of potential ecological concern in the most vulnerable watersheds, even when stewardship programs are employed. Therefore, EPA sees value in continuing the requirement for atrazine water monitoring (the AEEMP) in streams and watersheds that are exposed to atrazine runoff from corn and sorghum to monitor atrazine concentrations. Continued water monitoring in streams and watersheds (the AEEMP) is needed to determine when and where additional stewardship is necessary to protect aquatic plant communities from potential affects, as well as to monitor the success of on-going and new stewardship programs. In the future, if access to current and relevant ecological water monitoring data were not available to the Agency, EPA would not be able to integrate it into risk assessment and would have to rely on model estimated concentrations. However, in continuing the AEEMP program, EPA believes there is the potential to sample less frequently and still have a robust data set for use in future ecological risk assessment and risk management of atrazine. EPA held a FIFRA Scientific Advisory Panel (SAP) in November 2019 to obtain feedback about tools and approaches to interpret pesticide monitoring data collected at less frequent sampling intervals. The Agency is currently considering written feedback from the November 2019 SAP and developing plans for further work and implementation of the new tools and approaches. This

[14] 2004 EPA Memorandum of Agreement Between the U.S. Environmental Protection Agency and Agan Chemical Manufacturing, Dow AgroSciences, Drexel Chemical, Oxon Italia S.P.A., and Syngenta Crop Protection Concerning the Registration of Products Containing Atrazine. 2004.

effort will include considering ways to update the current AEEMP that could lessen the burden associated with the current monitoring program while still providing valuable data for use in ecological risk assessment and management of atrazine.

In April 2020, the Agency received and granted a request from Syngenta Crop Protection, LLC, a technical registrant, to suspend the requirement for the AEEMP for calendar year 2020 due to challenges in performing monitoring activities as a result of COVID-19 travel restrictions. This suspension is temporary and applies only to calendar year 2020; Syngenta has committed to resuming monitoring under the AEEMP in 2021.

C. Expected Impacts of Necessary Mitigation

The expected impacts of the necessary mitigation are presented below by use site unless otherwise noted. The intent is to help clarify to which situations specific mitigation apply and for each user group to determine how they will be impacted by all necessary mitigation. For more information see the following documents which are located in the docket, *Atrazine and Simazine Use on Sweet Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)*; *Atrazine and Propazine Use on Grain Sorghum and Fallow Areas: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080808)*; *Atrazine and Simazine Use on Field Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)*; *Atrazine in Sugarcane: Usage, Benefits, Impacts of Potential Mitigation, and Response to Comments; PC Code (080803)*; *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits*; and *Biological and Economic Analysis Division's (BEAD) Response to Comments on the Benefit Assessments for Triazine Use on Field Corn, Sorghum, Fallow, Sweet Corn, Sugarcane, Orchards, Vineyards, Caneberries, Strawberries, Christmas Trees, Forestry, Rights-of-Way, Turfgrass, and Nurseries.*

<u>Impacts of Spray Drift Management</u>
Given that spray drift language applies to all use sites, this category of mitigation is not addressed on an individual use site basis.

- *Impacts of Inversion Restriction*- This requirement could reduce the amount of time users have to apply triazines. Users may switch to other products that only have advisory language for this restriction if they encounter temperature inversions when needing to treat a field.

- *Impacts of the Percent of Usable Boom Length and Wind Speed Restrictions*- The adoption of this mitigation will result in no impact on atrazine applications when boom length is 75% or less for fixed wing aircraft. However, flexibility will be increased by allowing applications to occur at reduce percentage of useable boom lengths (65% or less) but when wind speeds are greater than 10 mph and less than 15 mph. Given that applications with fixed wing aircraft were previously prohibited at wind speeds greater than 10 mph, this change would increase flexibility.

For rotary aircraft, there would be a 15% increase in boom length when wind speeds are less than 10 mph, which could mean more area can be covered in less time. Additionally, there would be no reduction in boom length for applications made with helicopters when the wind speed is between 10 and 15 mph, which would provide greater flexibility for applicators given that aerial applications are not allowed above 10 mph.

The Agency has not assessed the impacts of windspeed restrictions for aerial applications and the requirement of a ½ swath displacement upwind at the downwind edge of the field.

- *Impacts of Establishing a Mandatory Maximum Spray Release Height Requirement for Ground Applications*- Spray release height is important to minimize overlap of spray from nozzles while maintaining proper coverage. The Agency has determined that a maximum release height of 4-feet, allows adequate coverage for the majority of nozzles[15]. Therefore, EPA does not anticipate any negative impacts to growers.

- *Impacts of Windspeed Restrictions for Ground Applications*- Wind conditions vary across the U.S. and wind speed restrictions could prevent timely applications of atrazine. Survey data[16] indicate that most applicators consider wind speed when making applications and typically apply at wind speeds of 15 mph or lower. However, there are situations when applicators will spray at wind speeds greater than 15 mph (less than 10 percent of survey respondents). Mandatory wind speed restrictions complicate weed and crop management by reducing the available time to make applications and make it more likely that a grower may need to alter weed control plans. Once the window of application passes for either the crop or weed, the weeds may be too large to be adequately controlled by atrazine, which could accelerate the development of resistance, or there may be phytotoxicity issues at the later crop stage, either of which could reduce yields. Alternatively, a grower may develop another weed control strategy. However, changing plans may be more costly given that a different, more expensive herbicide(s) may be used, or multiple applications needed to achieve the same level of weed control as atrazine. Additionally, growers are likely to incur higher costs if they hire a custom applicator or purchase additional spray equipment and hire additional personnel to operate the sprayers to make applications in a timely manner. If applications were not made in a timely manner, weed control could decline, leading to additional herbicide applications and/or yield losses.

- *Impacts of Droplet Size*- The Agency has determined that a restriction on droplet size is necessary because coarser droplets have been demonstrated to decrease spray drift, and therefore, reduce potential risks to non-target species. Because chemical-specific data for the performance of droplet sizes is limited, EPA was not able to evaluate the effects of medium or coarser droplet sizes (as defined by ASABE S572.1) specifically for atrazine. Therefore, EPA does not know the effect this mitigation measure will have on the

[15] Tindall, K. and C. Hanson. 2018. Qualitative Benefits and Usage Assessment of Diflufenzopyr (PC Code 005108) and Diflufenzopyr-Sodium (PC Code 005107). Available at: https://www.regulations.gov/document?D=EPA-HQ-OPP-2011-0911-0022

[16] Bish, M. and K.W. Bradley. 2017. Survey of Missouri Pesticide Applicator Practices, Knowledge, and Perceptions. Weed Technology 31:165–177. Available at: https://weedscience.missouri.edu/Pesticide%20Applicator%20Knowledge_2017.pdf.

performance of atrazine across various use patterns, especially regarding tank mix partners that require a finer droplet size. In general, potential negative impacts to growers from requiring larger droplets could include reductions in efficacy, increased selection pressure for the evolution of herbicide resistance due to a decrease in lethal dose delivered to target weeds, increased application rates used by growers, increased costs associated with reduced yield, more herbicide applications, purchase of alternative products, or an inability to use tank mix or premix products.

In addition to including the spray drift restrictions on atrazine labels, EPA determined that all references to volumetric mean diameter (VMD) information for spray droplets need to be removed from all atrazine labels where such information currently appears. The new language, which cites ASABE S572, eliminates the need for VMD information.

- *Impacts of Interaction of Individual Components of Spray Drift Mitigation*- The Agency acknowledges the impacts of multiple mitigation measures could be compounded and further reduce the time in which applicators could apply herbicides. For instance, applicators may deal with wind restrictions by spraying early in the morning/late evenings when winds are calmer; however, temperature inversions are more likely to occur several hours before sunset and can persist until 1-2 hours after sunrise. As the window of application gets smaller, growers will be forced to switch to products without these restriction on short notice. Therefore, the alternative may be based on availability and not cost and/or performance, which could be costly and reduce weed control. Additionally, growers may have situations where a tank is loaded and ready to spray, but they are not able to spray due to prolonged weather conditions that prevent application due mandatory multi-layered restrictions. In rare situations, there could be scenarios where applicators cannot spray what is mixed in the tank for a long period of time and would need to dispose of a large quantity of mixed herbicides in order to switch to an alternative mixture. There may be additional concerns (e.g., tank clean-out when products settle out) when a loaded tank sits hours, and possibly days.

Impacts of Mitigation by Use Site

FIELD CORN

Particulate Filtering Facepiece for Groundboom Applications Using DF/WDG Formulations

The impact of the proposed respirator requirement is likely to be substantially lower for an atrazine handler who is already using a respirator because the handler or handler's employer uses other chemicals requiring a respirator in the production system or as part of the business (*i.e.*, the handler or employer will only incur the cost of purchasing filters for the respirator on a more frequent basis). Mixers and loaders who do not already have the appropriate equipment would have to purchase the requisite equipment themselves, hire a commercial firm to make applications, or use other herbicides, which could be more expensive. The Agency does not know how many mixers and loaders currently have respirators. Additionally, pending implementation of the 2015 revised Worker Protection Standard rule, mixers and loaders would have to be fit-tested for use of respirators on a yearly basis. The Agency previously estimated the cost of a respirator fit test to be about $180 per applicator per year, including fees and the time required to obtain the test.

In addition to potential monetary costs of respirators, the use of a respirator can reduce productivity of workers wearing a respirator, which could increase the time required to mix and load tanks, which could increase costs. Alternatively, applicators may choose to use a different, more expensive herbicide that does not require a respirator.

Engineering Controls for Aerial Applications at Rates Equal to or Greater than 2 Pounds Active Ingredient per Acre
Given that less than 1% of corn acres are treated with atrazine aerially nationally, and that application rates are on average, less than 2 lbs a.i. of atrazine per acre, the Agency does not anticipate significant impacts. Additionally, contracted applicators likely have engineering controls[17] and the impacts of engineering control requirements would likely be small for situations where hired applicators are used.

Prohibition of Aerial Applications with DF/WDG/WSP Formulations
Of the 1.5 million acres of corn treated aerially with atrazine, applicators prefer to use liquid formulation of atrazine on 99% of aerial acres treated, and DF/WDG/Soluable Granules (SG) formulations account for the remaining 1% of acres treated (approximately 9,000 acres). Because there are relatively few acres treated with these formulations the Agency anticipates minimal impacts on growers.

Reduce the Amount of Dry-Bulk Commercial Fertilizer Impregnated
The current assumption is that 960 tons of dry bulk commercial fertilizer are treated in a day (EPA 2007). The Agency is proposing limiting the amount of fertilizer that can be impregnated (at a rate of 20 lbs of atrazine per ton) in a day to 340 tons of fertilizer. The Agency does not have any data on the use of the atrazine-impregnated fertilizer, but assumes its absence in extension guides, indicates this is an uncommon application method for atrazine. However, the Agency is uncertain if this reduction would have negative impacts to growers

Spray Drift
For impacts of the spray drift mitigation see above.

For more information refer to *Atrazine and Simazine Use on Field Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)* in the docket.

SORGHUM
Particulate Filtering Facepiece for Groundboom Applications Using DF/WDG Formulations
The impact of the necessary respirator measure is likely to be substantially lower for an atrazine handler who is already using a respirator because the handler or handler's employer uses other chemicals requiring a respirator in the production system or as part of the business (*i.e.*, the handler or employer will only incur the cost of purchasing filters for the respirator on a more

[17] *2019 NAAA Aerial Application Industry Survey: Operators* reports that 10% of respondents never used a closed system; *NAAA Professional Operating* Guidelines recommends using closed systems to the maximum extent possible for mixing and loading.

frequent basis). Mixers and loaders who do not already have the appropriate equipment would have to purchase the requisite equipment themselves, hire a commercial firm to make applications, or use other herbicides, which could be more expensive. The Agency does not know how many mixers and loaders currently have respirators. Additionally, pending implementation of the 2015 revised Worker Protection Standard rule, mixers and loaders would have to be fit-tested for use of respirators on a yearly basis. The Agency previously estimated the cost of a respirator fit test to be about $180 per applicator per year, including fees and the time required to obtain the test.

In addition to potential monetary costs of respirators, the use of a respirator can reduce productivity of workers wearing a respirator, which could increase the time required to mix and load tanks, which could increase costs. Alternatively, applicators may choose to use a different, more expensive herbicide that does not require a respirator.

Engineering Controls for Aerial Applications at Rates Equal to and Greater than 2 Pounds Active Ingredient per Acre
Given that less than 2% of sorghum acres are treated with atrazine aerially nationally, and that application rates are on average, less than 2 lbs of atrazine per acre, the Agency does not anticipate significant impacts to growers. Additionally, contracted applicators likely have engineering controls[18] and the impacts of engineering control requirements would likely be small for situations where hired applicators are used.

Prohibition of Aerial Applications with DF/WDG/WSP Formulations
Of the 77,000 acres of sorghum treated aerially with atrazine, applicators prefer to use liquid formulation of atrazine on 88% of aerial acres treated, and DF/WDG/SG formulations account for the remaining 12% (approximately 9,000 acres) of acres treated. Because there are relatively few acres treated with these formulations the Agency anticipates minimal impacts to growers.

Reduce the Amount of Dry-Bulk Commercial Fertilizer Impregnated
The current assumption is that 960 tons of dry bulk commercial fertilizer are treated in a day (EPA 2007). The Agency has determined that limiting the amount of fertilizer that can be impregnated (at a rate of 20 lbs of atrazine per ton) in a day to 340 tons of fertilizer is necessary. The Agency does not have any data on the use of the atrazine-impregnated fertilizer, but assumes its absence in extension guides, indicates this is an uncommon application method for atrazine. However, the Agency is uncertain if this reduction would have negative impacts to growers. EPA invites public comments to aid in determining what impact this could have on this practice.

Spray Drift
For impacts of the spray drift mitigation see above.

For more information refer to *Atrazine and Propazine Use on Grain Sorghum and Fallow Areas: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080808)*

[18] *2019 NAAA Aerial Application Industry Survey: Operators* reports that 10% of respondents never used a closed system; *NAAA Professional Operating* Guidelines recommends using closed systems to the maximum extent possible for mixing and loading.

in the docket.

SUGARCANE

Particulate Filtering Facepiece for Groundboom Applications Using DF/WDG Formulations

The impact of the necessary respirator measure is likely to be substantially lower for an atrazine handler who is already using a respirator because the handler or handler's employer uses other chemicals requiring a respirator in the production system or as part of the business (*i.e.*, the handler or employer will only incur the cost of purchasing filters for the respirator on a more frequent basis). Mixers and loaders who do not already have the appropriate equipment would have to purchase the requisite equipment themselves, hire a commercial firm to make applications, or use other herbicides, which could be more expensive. The Agency does not know how many mixers and loaders currently have respirators. Additionally, pending implementation of the 2015 revised Worker Protection Standard rule, mixers and loaders would have to be fit-tested for use of respirators on a yearly basis. The Agency previously estimated the cost of a respirator fit test to be about $180 per applicator per year, including fees and the time required to obtain the test.

In addition to potential monetary costs of respirators, the use of a respirator can reduce productivity of workers wearing a respirator, which could increase the time required to mix and load tanks, which could increase costs. Alternatively, applicators may choose to use a different, more expensive herbicide that does not require a respirator.

Engineering Controls for Aerial Applications at Rates Equal to or Greater than 2 Pounds Active Ingredient per Acre

No impact is expected from this mitigation because there is no aerial use of atrazine reported on sugarcane.

Prohibition of Aerial Applications with DF/WDG/WSP Formulations

No impact is expected from this mitigation because there is no aerial use of atrazine reported on sugarcane.

Spray Drift

For impacts of the spray drift mitigation see above.

For more information refer to *Atrazine in Sugarcane: Usage, Benefits, Impacts of Potential Mitigation, and Response to Comments; PC Code (080803)* in the docket.

SWEET CORN

Engineering Controls for Aerial Applications at Rates Equal to or Greater than 2 Pounds Active Ingredient per Acre

Given that only 5% of atrazine sweet corn acres treated are by aerial application, and that application rates for are on average, less than 1 lb of atrazine per acre, the Agency does not anticipate significant impacts to growers. Additionally, contracted applicators likely have engineering controls and the impacts of engineering control requirements would likely be small for situations where hired applicators are used.

Prohibition of Aerial Applications with DF/WDG/WSP Formulations
Though the Agency does not have data on the formulations applied aerially, data indicate that growers use liquid formulations of atrazine on approximately 84% of the acres treated and the remaining 16% are DF/WDG/SG formulations. Because there are relatively few acres treated by air with these formulations, the Agency anticipates minimal impact to growers.

Prohibition of Mechanically Pressurized Handguns
The Agency anticipates that mechanically pressurized handguns would be used for spot treatments to small areas, not for broadcast treatments over large acreages in sweet corn. In some instances, applicators may use a mechanically pressurized handgun attached to small ground boom sprayers to treat around an obstruction (e.g., telephone pole) or the perimeter of a field (e.g., fencerows). The growers who use mechanically pressurized handguns to make spot applications of triazines would either not make the applications and suffer any yield losses that may occur from poor weed control in areas normally spot treated; have to make a second application using a different application method; or choose a different herbicide(s) to treat the entire area, which may be more expensive and possibly less effective.

Spray Drift
For impacts of the spray drift mitigation see above.
For more information refer to *Atrazine and Simazine Use on Sweet Corn: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080807)* in the docket.

FALLOW
Particulate Filtering Facepiece for Groundboom Applications Using DF/WDG Formulations
The impact of the necessary respirator measure is likely to be substantially lower for an atrazine handler who is already using a respirator because the handler or handler's employer uses other chemicals requiring a respirator in the production system or as part of the business (*i.e.*, the handler or employer will only incur the cost of purchasing filters for the respirator on a more frequent basis). Mixers and loaders who do not already have the appropriate equipment would have to purchase the requisite equipment themselves, hire a commercial firm to make applications, or use other herbicides, which could be more expensive. The Agency does not know how many mixers and loaders currently have respirators. Additionally, pending implementation of the 2015 revised Worker Protection Standard rule, mixers and loaders would have to be fit-tested for use of respirators on a yearly basis. The Agency previously estimated the cost of a respirator fit test to be about $180 per applicator per year, including fees and the time required to obtain the test.

In addition to potential monetary costs of respirators, the use of a respirator can reduce productivity of workers wearing a respirator, which could increase the time required to mix and load tanks, which could increase costs. Alternatively, applicators may choose to use a different, more expensive herbicide that does not require a respirator.

Engineering Controls for Aerial Applications at Rates Equal to or Greater than 2 Pounds Active Ingredient per Acre

Of the fallow acres treated with atrazine, less than 1% are treated aerially per year. Additionally, application rates for are on average, less than 1 lb of atrazine per acre. Therefore, the Agency does not anticipate significant impacts to growers. Additionally, contracted aerial applicators likely have engineering controls and the impacts of engineering control measures would likely be small for situations where hired applicators are used.

Prohibition of Aerial Applications with DF/WDG/WSP Formulations
As mentioned above, less than 1% of acres treated with atrazine are treated aerially. Of those acres, 84% of the treated acres are treated with the liquid formulation, and the remaining 16% is treated with DF/WDG/SG. Because there are relatively few acres treated with these formulations, the Agency anticipates minimal impact.

Spray Drift
For impacts of the spray drift mitigation see above.

For more information refer to *Atrazine and Propazine Use on Grain Sorghum and Fallow Areas: Response to Comments, Usage, Benefits, and Impacts of Potential Mitigation; PC Codes (080803 and 080808)*
in the docket.

ORCHARDS (GUAVA AND MACADAMIA NUTS)
Prohibition of Aerial Applications with DF/WDG/WSP Formulations
The Agency does not have any pesticide usage data for these use sites but assumes impacts would be minimal given that other use sites prefer liquid applications. In addition, for the orchards sites for which there is usage data, simazine not atrazine is the triazine that is typically used.

Coveralls over Long-Sleeve Shirt and Pants, and Gloves for Macadamia Nuts
The need for coveralls over long-sleeve shirt and pants, as well as gloves, for users applying via backpack will not likely impact the overall use of atrazine since it is likely rarely applied via backpack. However, users who apply with backpack equipment, may incur some additional costs or burdens. For example, the use of a PPE (e.g., wearing double layers when applying pesticides) can reduce productivity of workers because of the physiological stress when working in high temperatures and/or humid conditions.[19] Workers may need to take more frequent breaks in certain situations than if extra PPE were not required. Individuals will respond differently depending on many factors, such as fitness level, hydration, acclimatization, etc. The requirement of additional PPE when individuals are applying atrazine with a backpack applicator could decrease productivity, which will increase the time required for an application to be made, and likely increase costs. Alternatively, applicators may choose to use a different herbicide, which could be more expensive and potentially less effective than atrazine.

Prohibition of Mechanically Pressurized Handguns for Macadamia Nuts and Guava

[19] O'Brien, C., L.A. Blanchard, B.S. Cadarette, T.L. Endrusick, X. Xu, L.G. Berglund, M.N. Sawka, and R.W. Hoyt. 2011. Methods of evaluating protective clothing relative to heat and cold stress: thermal manikin, biomedical modeling, and human testing. Journal of Occupational and Environmental Hygiene 8: 588-599.

The Agency does not have data on applications of atrazine made to these sites via mechanically pressurized handguns. This application, n method type is most likely used for spot treatments. It may also be used for strip or trunk to trunk spray treatments when making applications from a handgun sprayer that is attached to the groundboom sprayers. Most groundboom sprayers used in orchards and vineyards have booms smaller than those used in large-acreage row crops, and they may have attached handguns.

Spray Drift
For impacts of the spray drift mitigation see above.

TURF
For atrazine use on turfgrass sites, the Agency has determined that mitigation for risks to human health and the environment need to include requiring application rate reductions of atrazine on residential turfgrass; requiring application rate reductions for applications made with mechanically pressurized handguns and backpack sprayers; reducing the amount of impregnated fertilizer treated in a day; and prohibiting aerial applications. The application rate reductions are not expected to severely impede use and aerial applications to turfgrass sites are not common. The Agency does not have information on the impacts of limiting the amount of impregnated fertilizer treated in a day, but this is product type (herbicide impregnated on fertilizer) is a common one for atrazine. For impacts of the spray drift mitigation see above.

For more information refer to *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits PC Codes (080803 and 080807)* in the docket.

RIGHTS-OF-WAY
For rights-of-way sites, the Agency has determined mitigation for risks to human health and the environment from use of atrazine are necessary, including an application rate reduction, double layer clothes and gloves for backpack sprayers, and a particulate filtering facepiece for ground applications. For mechanically pressurized handguns, EPA determined that the application would need to have a minimum of 87 gallons of spray solution per acre. In addition, the Agency is considering prohibiting aerial applications to rights-of-ways. For droplet size, maximum spray release height, wind restrictions, temperature inversions the mitigations are similar to those listed for forestry use. Atrazine does not appear to be widely used in rights-of-way sites, so any potential mitigation proposed is not expected to have high impacts on weed control in rights-of-way. For impacts of the spray drift mitigation see above.

For more information refer to *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits; PC Codes (080803 and 080807)* in the docket.

NURSERY AND ORNAMENTALS
For nursery/ornamental sites, the Agency has determined that mitigation for risks to human health and the environment from use of atrazine is necessary, including restricting mechanically pressurized handguns to spot treatments only. It is expected that the primary use of mechanically

pressurized handguns in these sites is for spot treatments, so this necessary mitigation is not expected to be impactful for users. For impacts of the spray drift mitigation, see above.

For more information refer to *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits; PC Codes (080803 and 080807)* in the docket.

FORESTRY

For forestry use sites, the Agency has determined that mitigation for risks to human health and the environment from the use of atrazine including double layers of clothes for backpack applications and respirators for ground applications of certain formulations are necessary. In addition, the Agency has also determined that mitigation for aerial applications to these sites including limiting aerial application to liquid formulations only, engineering controls (e.g., closed systems for mixing/loading and modifying the boom width based on wind speed) and application rate reductions for certain formulations are necessary. All of the aforementioned necessary mitigation measures are not expected to have high impacts on users. This is because these necessary mitigation measures only apply to certain formulations of atrazine (e.g., the requirement for respirators) or they align with current practices (e.g. typically using liquid formulations with aerial applications). For impacts of the spray drift mitigation see above.
For more information refer to *Atrazine and Simazine Use in Forestry, Rights of Way, Turfgrass, and Nursery: Response to Comments, Usage, and Benefits; PC Codes (080803 and 080807)* in the docket.

CONSERVATION RESERVE PROGRAM AND WINTER WEED CONTROL AREAS

Particulate Filtering Facepiece for Groundboom Applications Using DF/WDG Formulations

The impact of the necessary respirator requirement is likely to be substantially lower for an atrazine handler who is already using a respirator because the handler or handler's employer uses other chemicals requiring a respirator in the production system or as part of the business (*i.e.*, the handler or employer will only incur the cost of purchasing filters for the respirator on a more frequent basis). Mixers and loaders who do not already have the appropriate equipment would have to purchase the requisite equipment themselves, hire a commercial firm to make applications, or use other herbicides, which could be more expensive. The Agency does not know how many mixers and loaders currently have respirators. Additionally, pending implementation of the 2015 revised Worker Protection Standard rule, mixers and loaders would have to be fit-tested for use of respirators on a yearly basis. The Agency previously estimated the cost of a respirator fit test to be about $180 per applicator per year, including fees and the time required to obtain the test.

In addition to potential monetary costs of respirators, the use of a respirator can reduce productivity of workers wearing a respirator, which could increase the time required to mix and load tanks, which could increase costs. Alternatively, applicators may choose to use a different, more expensive herbicide that does not require a respirator. For impacts of the spray drift mitigation see above.

Engineering Controls for Aerial Applications at Rates Greater than 2 Pounds Active Ingredient per Acre
The Agency does not have any pesticide usage data for these use sites but assumes impacts would be similar to other use sites (i.e., minimal impact).

Prohibition of Aerial Applications with DF/WDG/WSP Formulations
The Agency does not have any pesticide usage data for these use sites but assumes impacts would be similar to other use sites (i.e., minimal impact

Spray Drift
For impacts of the spray drift mitigation see above.

BIOENERGY CROPS
Reduce the Amount of Dry-Bulk Commercial Fertilizer Impregnated
The current assumption is that 960 tons of dry bulk commercial fertilizer are treated in a day (EPA 2007). The Agency has determined that it is necessary to limit the amount of fertilizer that can be impregnated (at a rate of 20 lbs of atrazine per ton) in a day to 340 tons of fertilizer per day per worker. The Agency does not have any data on the use of the atrazine-impregnated fertilizer, but assumes its absence in extension guides, indicates this is an uncommon application method for atrazine. However, the Agency is uncertain if this reduction would have negative impacts to growers.

Spray Drift
For impacts of the spray drift mitigation see above.

D. Tolerance Actions

The Agency has determined that the establishment, revocation, and the amendment of tolerances for several commodities is necessary. Refer to Section III.A.3 for details. The Agency will use its FFDCA rulemaking authority to make the needed changes to the tolerances.

E. Interim Registration Review Decision

In accordance with 40 CFR §§ 155.56 and 155.58, the Agency is issuing this ID. Except for the Endocrine Disruptor Screening Program (EDSP) and the Endangered Species Act (ESA) components of this case, the Agency has made the following interim decision: (1) no additional data are required at this time; and (2) changes to the affected registrations and their labeling are needed at this time, as described in Section IV. A and Appendices A and B.

In this ID, the Agency is making no human health or environmental safety findings associated with the EDSP screening of atrazine, nor is it making a final endangered species finding. Although the Agency is not making a final endangered species finding at this time, the necessary mitigation described in this document, when implemented on labels, is expected to reduce the extent of environmental exposure and may reduce risk to listed species whose range and/or critical habitat co-occur with the use of atrazine. The Agency's final registration review decision

for atrazine will be dependent upon the result of the Agency's ESA assessment and any needed § 7 consultation with the Services and an EDSP FFDCA § 408(p) determination.

F. Data Requirements

On December 12, 2018, the Agency issued a generic data call-in (GDCI) requiring multiresidue method testing results (OCSPP Guideline 860.1360) for the chlorinated metabolites of atrazine [desethylatrazine (DEA), desisopropylatrazine (DIA), and diaminochloroatrazine (DACT)]; the data are required to be submitted to the Agency by December 20, 2020. These data are needed to determine the suitability of multiresidue methodology for quantification of atrazine and its regulated metabolites.

The analytical reference standards for desisopropylatrazine (DIA) and diaminochloroatrazine (DACT) have expired and must be submitted to EPA's National Pesticide Standards Repository (see https://www.epa.gov/pesticide-analytical-methods/national-pesticide-standard-repository).

No additional data are anticipated to be needed to be called-in for this registration review at this time. The Agency will consider requiring submission of pollinator data as a separate action.

V. NEXT STEPS AND TIMELINE

A. Interim Registration Review Decision

A Federal Register Notice will announce the availability of this Interim Registration Review Decision for atrazine. A final decision on the atrazine registration review case will occur after: (1) an EDSP FFDCA § 408(p) determination, and (2) an endangered species determination under the ESA and any needed § 7 consultation with the Services.

B. Implementation of Mitigation Measures

Once the Interim Registration Review Decision is issued, the atrazine registrants must submit amended labels that include the label changes described in Appendices A and B. The revised labels and requests for amendment of registrations must be submitted to the Agency for review within 60 days following issuance of the Interim Registration Review Decision in the docket. Registrants must submit a cover letter, a completed Application for Registration (EPA form 8570-1) and electronic copies of the amended product labels. Two copies for each label must be submitted, a clean copy and an annotated copy with changes. In order for the application to be processed, registrants must include the following statement on the Application for Registration (EPA form 8570-1):

"I certify that this amendment satisfies the requirements of the Atrazine Interim Registration Review Decision and EPA regulations at 40 CFR Section 152.44, and no other changes have been made to the labeling of this product. I understand that it is a violation of 18 U.S.C. Section

1001 to willfully make any false statement to EPA. I further understand that if this amendment is found not to satisfy the requirements of the Atrazine Interim Registration Review Decision and 40 CFR Section 152.44, this product may be in violation of FIFRA and may be subject to regulatory and/or enforcement action and penalties under FIFRA."

Within the required timeframe, registrants must submit the required documents to the Re-evaluation section of EPA's Pesticide Submission Portal (PSP), which can be accessed through EPA's Central Data Exchange (CDX) using the following link: https://cdx.epa.gov/. Registrants may instead send paper copies of their amended product labels, with an application for a fast-track, Agency-initiated non-PRIA label amendment to Linsey Walsh at one of the following addresses, so long as the labels and application are submitted within the required timeframe:

VIA US Mail
USEPA Office of Pesticide Programs
Pesticide Re-evaluation Division
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C. Next Steps and Timeline

A draft Biological Evaluation (BE) for atrazine under the Endangered Species Act (ESA) is scheduled for release and public comment by the end of 2020. Given the current schedule for the draft biological evaluation for atrazine, it is in that assessment where EPA plans to more fully integrate input received during the public comment period for the draft ecological risk assessment conducted for the registration review decision under FIFRA, to the extent it is not already addressed herein. For more specific information about the incorporation of newer data, reanalysis and assessment of existing studies, and use of alternate assessment methodologies in the BE, see *Atrazine--Environmental Fate and Effects Division's Response to Public Comments* (https://beta.regulations.gov/document/EPA-HQ-OPP-2013-0266-1267) and *Regulatory Update on the Registration Review of Atrazine* (https://beta.regulations.gov/document/EPA-HQ-OPP-2013-0266-1260).

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Appendix A: Summary of Required Actions for Atrazine

Registration Review Case#: 0062
PC Code: 080803
Chemical Type: Herbicide
Chemical Family: Triazine
Mode or Mechanism of Action: Group 5 - Inhibition of photosynthesis at photosystem II

Affected Population(s)	Source of Exposure	Route of Exposure	Duration of Exposure	Potential Risk(s) of Concern	Required Actions	Comment
• Children 1 to <2 years old	• Chlorotriazine cumulative aggregate exposure (food +water + residential post-application exposure to treated residential turf)	• Dietary (food) • Combined dermal and incidental oral (residential post-application to treated residential turf)	• 4-day and longer	• LH surge suppression	• Rate reduction (atrazine residential turf granular formulations, from 2.2 lbs ai/A to 2.0 lbs ai/A)	
• Occupational handler (mixer/loader)	• Air (e.g., respirable particles at/on site while mixing/loading) • Residues (e.g., at /on site while mixing/loading)	• Combined dermal and inhalation	• 4-day and longer	• LH surge suppression	• Require additional PPE and/or EC for certain uses • Restrict aerial application to liquid formulations only • Restrict impregnation of dry bulk fertilizer for use in agricultural settings to 340 tons per worker per day	
• Occupational handler (mixer/loader/applicator)	• Air (e.g., respirable particles at/on site while mixing/ loading/ applying) • Residues (e.g., residues at/on site while mixing/ loading/ applying)	• Combined dermal and inhalation	• 4-days and longer	• LH surge suppression	• Require additional PPE for certain uses • Restrict landscape turf application via backpack spray to spot treatments only and require additional PPE • Prohibit mechanically pressurized handgun application to macadamia nuts, sweet corn, and guava	
• Terrestrial Plants; Avian; Mammals; Terrestrial Invertebrates	• Aerial and ground applications	• Foliar absorption; consumption of food items with residues on treated field	• Acute, chronic	• Mortality and sublethal effects	• Require mandatory spay drift reduction measures/language	
• Fish; Aquatic Invertebrates; Aquatic Plants	• Run-off and spray drift	• Foliar absorption; consumption of food items with residues on treated field	• Acute, chronic	• Mortality and sublethal effects	• Require Atrazine Stewardship Program	

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Appendix B: Required Labeling Changes for Atrazine Products

<table>
<tr><th>Description</th><th>Required Label Changes for Atrazine Products</th><th>Placement on Label</th></tr>
<tr><td>Aerial Application Prohibition</td><td>Restrict aerial application to liquid formulations only. For products applied by air remove all other formulation types from labels (e.g., dry flowable/water dispersable granular and water-soluble packages).</td><td></td></tr>
<tr><td>Mechanically Pressurized Handgun Application Prohibition</td><td>Prohibit application via mechanically pressurized handguns to macadamia nuts, sweet corn, and guava and remove this application method (mechanically pressurized handguns) from product labels for these uses.</td><td></td></tr>
<tr><td>Residential Turf Use Rate Reduction for Residential Turf</td><td>• Residential turf, granular formulations- reduce the single maximum application rate to 2.0 lbs ai/A
• Residential turf, sprays- reduce the single maximum application rate to 1.0 lb ai/A</td><td></td></tr>
<tr><td>Use Restrictions for Dry Bulk Fertilizer; Sorghum; and Landscape Turf</td><td>• Dry bulk fertilizer- Restrict the impregnation of dry bulk commercial fertilizer to 340 tons per worker per day for no more than 30 days per calendar year for use on corn, sorghum, bioenergy, and sod
• Sorghum- Do not apply atrazine and propazine products to the same sorghum acre
• Applications made by backpack-spray to landscape turf- Restrict backpack application to landscape turf to spot treatments only</td><td></td></tr>
<tr><td>Roadside Use Deletion</td><td>• Remove roadside use site from all product labels</td><td></td></tr>
<tr><td colspan="3">Required Label Language for End Use Products</td></tr>
<tr><td>Mechanism of Action Group Number</td><td>Note to registrant:
• Include the name of the ACTIVE INGREDIENT in the first column
• Include the word “GROUP” in the second column
• Include the MECHANISM OF ACTION CODE “5” in the third column
• Include the type of pesticide “HERBICIDE” in the fourth column.
<table><tr><td>Atrazine</td><td>GROUP</td><td>5</td><td>HERBICIDE</td></tr></table></td><td>Front Panel, upper right quadrant.
All text should be black, bold face and all caps on a white background, except the mode of action code, which should be white, bold face and all caps on a black background; all text and columns should be surrounded by a black rectangle.</td></tr>
</table>

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Description	Required Label Changes for Atrazine Products	Placement on Label
Label Statement prohibiting application of atrazine and simazine products to same sorghum acre, for all atrazine labels with sorghum uses	Add the following language to all labels with sorghum uses: "Do not apply atrazine and propazine products to the same sorghum acre."	Directions for Use and under use rate tables
Updated Gloves Statement	Update the glove statements to be consistent with Chapter 10 of the Label Review Manual	In the Personal Protective Equipment (PPE) within the Precautionary Statements and Agricultural Use Requirements, if applicable
Updated Respirator Language	[**Note to registrant**: If your end-use product only requires protection from particulates only (low volatility), use the following language:] "Wear a minimum of a NIOSH-approved particulate filtering facepiece respirator with any N*, R or P filter; OR a NIOSH-approved elastomeric particulate respirator with any N*, R or P filter; OR a NIOSH-approved powered air purifying respirator with HE filters." *Drop the "N" option if there is oil in the product's formulation and/or the product is labeled for mixing with oil-containing products. [**Note to registrant:** For respiratory protection from organic vapor and particulates (or aerosols), use the following language:] "Wear a minimum of a NIOSH-approved elastomeric half mask respirator with organic vapor (OV) cartridges and combination N*, R, or P filters; OR a NIOSH-approved gas mask with OV canisters; OR a NIOSH-approved powered air purifying respirator with OV cartridges and combination HE filters." [**Note to registrant:** For products requiring protection for organic vapor only, use the following language:] "Wear a minimum of a NIOSH-approved elastomeric half mask respirator with organic vapor (OV) cartridges; OR a NIOSH-approved full face respirator with OV cartridges; OR a gas mask with OV canisters; OR a powered air purifying respirator with OV cartridges." *Drop the "N" option if there is oil in the product's formulation and/or the product is labeled for mixing with oil-containing products.	In the Personal Protective Equipment (PPE) within the Precautionary Statements

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Description	Required Label Changes for Atrazine Products	Placement on Label
Non-target Organism Advisory Statement	"NON-TARGET ORGANISM ADVISORY STATEMENT: This product is toxic to plants and may adversely impact the forage and habitat of non-target organisms, including pollinators, in areas adjacent to the treated site. Protect the forage and habitat of non-target organisms by following label directions intended to minimize spray drift."	Environmental Hazards
HERBICIDE RESISTANCE MANAGEMENT: Weed Resistance Management	Include resistance management label language for herbicides from PRN 2017-1 and PRN 2017-2 (https://www.epa.gov/pesticide-registration/pesticide-registration-notices-year)	Directions for Use, prior to directions for specific crops under the heading "WEED RESISTANCE-MANAGEMENT"
Additional Required Labelling Action- Applies to all products delivered via liquid spray applications	Remove information about volumetric mean diameter from all labels where such information currently appears.	Directions for Use
Directions for mixing/loading products packaged in water soluble bags	Instructions for Introducing Water Soluble Packages Directly into Spray tanks: "Soluble Packages (WSPs) are designed to dissolve in water. Agitation may be used, if necessary, to help dissolve the WSP. Failure to follow handling and mixing instructions can increase your exposure to the pesticide products in WSPs. WSPs, when used properly, qualify as a closed mixing/loading system under the Agricultural Worker Protection Standard [40 CFR 170.607(d)]. Handling Instructions Follow these steps when handling pesticide products in WSPs. 1.Mix in spray tank only. 2.Handle the WSP in a manner that protects package from breakage and/or unintended release of contents. If package is broken, put on PPE required for clean-up and then continue with mixing instructions. 3.Keep the WSP in outer packaging until just before use. 4.Keep the WSP dry prior to adding to the spray tank. 5.Handle with dry gloves and according to the label instructions for PPE. 6.Keep the WSP intact. Do not cut or puncture the WSP. 7.Reseal the WSP outer packaging to protect any unused WSP(s). Mixing Instructions Follow the steps below when mixing this product, including if it is tank-mixed with other pesticide products. If being tank-mixed, the mixing directions 1 through 9 below take precedence over the mixing directions of the other tank mix	Directions for Use

Description	Required Label Changes for Atrazine Products	Placement on Label
	products. WSPs may, in some cases, be mixed with other pesticide products so long as the directions for use of all the pesticide product components do not conflict. Do not tank-mix this product with products that prohibit tank-mixing or have conflicting mixing directions. 1.If a basket or strainer is present in the tank hatch, remove prior to adding the WSP to the tank. 2.Fill tank with water to approximately one-third to one-half of the desired final volume of spray. 3.Stop adding water and stop any agitation. 4.Place intact/unopened WSP into the tank. 5.Do not spray water from a hose or fill pipe to break or dissolve the WSP. 6.Start mechanical and recirculation agitation from the bottom of tank without using any overhead recirculation, if possible. If overhead recirculation cannot be turned off, close the hatch before starting agitation. 7.Dissolving the WSP may take up to 5 minutes or longer, depending on water temperature, water hardness and intensity of agitation. 8.Stop agitation before tank lid is opened. 9.Open the lid to the tank, exercising caution to avoid contact with dusts or spray mix, to verify that the WSP has fully dissolved and the contents have been thoroughly mixed into the solution. 10.Do not add other allowed products or complete filling the tank until the bags have fully dissolved and pesticide is thoroughly mixed. 11.Once the WSP has fully dissolved and any other products have been added to the tank, resume filling the tank with water to the desired level, close the tank lid, and resume agitation. 12.Use the spray solution when mixing is complete. 13.Maintain agitation of the diluted pesticide mix during transport and application. 14.It is unlawful to use any registered pesticide, including WSPs, in a manner inconsistent with its label. ENGINEERING CONTROLS STATEMENT Water soluble packets, when used correctly, qualify as a closed mixing/loading system under the Worker Protection Standard [40 CFR 170.607(d)]. Mixers and loaders handling this product while it is enclosed in intact water-soluble packets may elect to wear reduced PPE of long-sleeved shirt, long pants, shoes, socks, a chemical-resistant apron, and chemical-resistant gloves. When reduced PPE is worn because a closed system is being used, handlers must be provided all PPE specified above for "applicators and other handlers" and have such PPE immediately available for use in an emergency, such as in case of a spill or equipment break-down."	
Spray Drift Management Application Restrictions for all products delivered via liquid spray	**"MANDATORY SPRAY DRIFT MANAGMENT** **Aerial Applications**: • Do not release spray at a height greater than 10 ft above the ground or vegetative canopy, unless a greater application height is necessary for pilot safety. • Applicators are required to use a medium or coarser droplet size (ASABE S572).	Directions for Use, in a box titled "Spray Drift" under the heading "Aerial Applications"

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Description	Required Label Changes for Atrazine Products	Placement on Label
application and allow aerial application	• If the windspeed is 10 miles per hour or less, applicators must use ½ swath displacement upwind at the downwind edge of the field. When the windspeed is between 11-15 miles per hour, applicators must use ¾ swath displacement upwind at the downwind edge of the field. • Do not apply when wind speeds exceed 15 mph at the application site. If the windspeed is greater than 10 mph, the boom length must be 65% or less of the wingspan for fixed wing aircraft and 75% or less of the rotor diameter for helicopters. Otherwise, the boom length must be 75% or less of the wingspan for fixed-wing aircraft and 90% or less of the rotor diameter for helicopters • Do not apply during temperature inversions."	
Spray Drift Management Application Restrictions for products that are applied as liquids and allow ground boom applications	**"MANDATORY SPRAY DRIFT MANAGMENT** **Ground Boom Applications:** • User must only apply with the release height recommended by the manufacturer, but no more than 4 feet above the ground or crop canopy. • Applicators are required to use a medium or coarser droplet size (ASABE S572). • Do not apply when wind speeds exceed 15 miles per hour at the application site. • Do not apply during temperature inversions."	Directions for Use, in a box titled "Spray Drift" under the heading "Ground Boom Applications"
Spray Drift Management Application Restrictions for products that are applied as liquids and allow boom-less ground sprayer applications	**"MANDATORY SPRAY DRIFT MANAGMENT** **Boomless Ground Applications:** • Applicators are required to use a medium or coarser droplet size (ASABE S572) for all applications. • Do not apply when wind speeds exceed 15 miles per hour at the application site. • Do not apply during temperature inversions.	Directions for Use, in a box titled "Spray Drift" under the heading "Boomless Applications"
Advisory Spray Drift Management Language for all products delivered via liquid spray application	**"SPRAY DRIFT ADVISORIES** THE APPLICATOR IS RESPONSIBLE FOR AVOIDING OFF-SITE SPRAY DRIFT. BE AWARE OF NEARBY NON-TARGET SITES AND ENVIRONMENTAL CONDITIONS. **IMPORTANCE OF DROPLET SIZE** An effective way to reduce spray drift is to apply large droplets. Use the largest droplets that provide target pest control. While applying larger droplets will reduce spray drift, the potential for drift will be greater if applications are made improperly or under unfavorable environmental conditions.	Directions for Use, just below the Spray Drift box, under the heading "Spray Drift Advisories"

Description	Required Label Changes for Atrazine Products	Placement on Label
	Controlling Droplet Size – Ground Boom ***(note to registrants:*** *remove if ground boom is prohibited on product labels)* • Volume - Increasing the spray volume so that larger droplets are produced will reduce spray drift. Use the highest practical spray volume for the application. If a greater spray volume is needed, consider using a nozzle with a higher flow rate. • Pressure - Use the lowest spray pressure recommended for the nozzle to produce the target spray volume and droplet size. • Spray Nozzle - Use a spray nozzle that is designed for the intended application. Consider using nozzles designed to reduce drift. **Controlling Droplet Size – Aircraft** ***(note to registrants:*** *remove if aerial application is prohibited on product labels)* • Adjust Nozzles - Follow nozzle manufacturers' recommendations for setting up nozzles. Generally, to reduce fine droplets, nozzles should be oriented parallel with the airflow in flight. **BOOM HEIGHT – Ground Boom** ***(note to registrants:*** *remove if ground boom is prohibited on product labels)* For ground equipment, the boom should remain level with the crop and have minimal bounce. **RELEASE HEIGHT - Aircraft** ***(note to registrants:*** *remove if aerial application is prohibited on product labels)* Higher release heights increase the potential for spray drift. **SHIELDED SPRAYERS** Shielding the boom or individual nozzles can reduce spray drift. Consider using shielded sprayers. Verify that the shields are not interfering with the uniform deposition of the spray on the target area. **TEMPERATURE AND HUMIDITY** When making applications in hot and dry conditions, use larger droplets to reduce effects of evaporation. **TEMPERATURE INVERSIONS** Drift potential is high during a temperature inversion. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. The presence of an inversion can be indicated by ground fog or by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing. Avoid applications during temperature inversions. **WIND**	

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Description	Required Label Changes for Atrazine Products	Placement on Label
	Drift potential generally increases with wind speed. AVOID APPLICATIONS DURING GUSTY WIND CONDITIONS. Applicators need to be familiar with local wind patterns and terrain that could affect spray drift."	
Advisory Spray Drift Management Language for products that are applied as liquids and allow boom-less ground sprayer applications	**"SPRAY DRIFT ADVISORIES** **Boomless Ground Applications:** Setting nozzles at the lowest effective height will help to reduce the potential for spray drift."	Directions for Use, just below the Spray Drift box, under the heading "Spray Drift Advisories"
Advisory Spray Drift Management Language for all products that allow liquid applications with handheld technologies	**"SPRAY DRIFT ADVISORIES** **Handheld Technology Applications:** • Take precautions to minimize spray drift."	Directions for Use, just below the Spray Drift box, under the heading "Spray Drift Advisories"

CERTIFICATE OF SERVICE

I hereby certify that on October 30, 2020, I electronically filed the foregoing **Petition for Review**, **Exhibits A-C**, and this **Certificate of Service** with the Clerk of the Court for the United States Court of Appeals for the Ninth Circuit by using the CM/ECF system. I caused to be served one true and correct copy of the foregoing via certified mail on the following persons:

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