July 1, 2024

Office of Pesticide Programs
Environmental Protection Agency Docket Center (EPA/DC), (28221T)
1200 Pennsylvania Ave. NW
Washington, DC 20460-0001

RE: EPA's Amended Proposed Interim Registration Review Decision for Ziram; Docket ID: EPA-HQ-OPP-2015-0568

The National Agricultural Aviation Association (NAAA) appreciates the opportunity to comment on EPA's amended proposed interim registration review decision for ziram.

U.S. Aerial Application Industry Background: NAAA represents the interests of the 1,560 aerial application industry owner/operators and 2,028 non-operator agricultural pilots throughout the United States licensed as commercial applicators that use aircraft to enhance the production of food, fiber and bio-energy; protect forestry; protect waterways and ranchland from invasive species; and provide services to agencies and homeowner groups for the control of mosquitoes and other health-threatening pests.

Within agriculture and other pest control situations, manned aerial application is an important method for applying pesticides, for it permits large areas to be covered rapidly—by far the fastest application method of crop inputs—when it matters most. It takes advantage, more than any other form of application, of the often too-brief periods of acceptable weather for spraying and allows timely treatment of pests while they are in critical developmental stages, often over terrain that is too wet or otherwise inaccessible for terrestrial applications. It also treats above the crop canopy, thereby not disrupting the crop and damaging it. Aerial application has greater productivity, accuracy, speed, and is unobtrusive to the crop compared to ground application[1]. Although the average aerial application company is comprised of but six employees and two aircraft, as an industry these small businesses treat nearly 127 million acres of U.S. cropland each season, which is about 28% of all cropland used for crop production in the U.S. In addition to the cropland acres, aerial applicators annually apply to 5.1 million acres of forest land, 7.9 million acres of pasture and rangeland, and 4.8 million acres for mosquito control and other public health concerns.

While there are alternatives to making aerial applications of pesticides, aerial application has several advantages. In addition to the speed and timeliness advantage aerial application has over other forms of application, there is also a yield difference. Driving a ground sprayer through a

[1] Kováčik, L., and A. Novák, 2020. "Comparison of Aerial Application vs. Ground Application." *Transportation Research Procedia* 44 (2020) 264–270.

standing crop results in a significant yield loss. Research from Purdue University[2] found that yield loss from ground sprayer wheel tracks varied from 1.3% to 4.9% depending on boom width. While this study was conducted in soybeans, similar results could be expected in other crops as well. Data from a Texas A&M University economics study[3] and the 2019 NAAA industry survey[4] were used to calculate that the aerial application industry is directly responsible for the production of 1.69 billion bushels of corn, 199 million bushels of wheat, 548 million pounds of cotton, 295 million bushels of soybeans, and 3.33 billion pounds of rice annually that would be lost every year without the aerial application of pesticides. The value in additional crop yield that the aerial application industry brings to farmers, input suppliers, processors, and agricultural transportation and storage industries for corn, wheat, cotton, soybean, and rice production in the U.S. is estimated to be about $37 billion[5].

Research summarized by the University of Minnesota[6] describes how soil compaction from ground rigs can negatively affect crop yields due to nitrogen loss, reduced potassium availability, inhibition of root respiration due to reduced soil aeration, decreased water infiltration and storage, and decreased root growth. Aerial application offers the only means of applying a crop protection product when the ground is wet and when time is crucial during a pest outbreak. A study on the application efficacy of fungicides on corn applied by ground, aerial, and chemigation applications[7] further demonstrates that aerial application exceeds ground and chemigation application methods in terms of yield response. The aerial application of crop protection products results in greater harvest yields of crops. This in turn results in less land being used for agricultural production, preserving more wetlands for natural water filtration, forest ecosystems for carbon sequestration and habitat for threatened and endangered species.

The Texas A&M[4] study revealed that the total area of cropland needed to replace the yield lost if aerial application was not available for corn, wheat, soybean, cotton, and rice production is 27.4 million acres, an area roughly the size of Tennessee. Aerial applicators seed 3.8 million acres of cover crops annually[5]. This means that aerial applicators are responsible for helping to sequester 1.9 million metric tons of CO_2 equivalent annually, which according to the EPA would be the equivalent of removing approximately 412,000 cars with carbon-combustion engines from the roads each year.

The aerial application industry is also actively involved in education and research efforts to improve the accuracy and safety of aerial applications. The National Agricultural Aviation Research and Education Foundation (NAAREF) is a non-profit organization dedicated to

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[2] Hanna, S., S. Conley, J. Santini, and G. Shaner. 2007. "Managing Fungicide Applications in Soybean." Purdue University Extension Soybean Production Systems SPS-103-W. https://www.extension.purdue.edu/extmedia/sps/sps-103-w.pdf
[3] Dharmasena, S. 2020. "How Much is the Aerial Application Industry Worth in the United States?" Research presented at the 2020 Ag Aviation Expo, Savannah, GA. https://www.agaviation.org/2020aatresearchpapers
[4] National Agricultural Aviation Association. May 2019. "2019 NAAA Aerial Application Industry Survey: Operators." https://www.agaviation.org//Files/Comments/NAAA%202019%20Operator%20Survey.pdf
[5] Dharmasena, S. 2021. "Value of the Agricultural Aerial Application Industry in the United States" Research presented at the 2021 Ag Aviation Expo, Savannah, GA. https://www.agaviation.org/2021aatresearchpapers
[6] University of Minnesota. "Soil Compaction." Accessed April 29, 2021. https://extension.umn.edu/soil-management-and-health/soil-compaction
[7] Thomas, D. 2009. Unpublished research results submitted to EPA. https://www.agaviation.org//Files/Comments/Fungicide%20efficacy%20results.pdf

promoting research, technology transfer and advanced education among aerial applicators, allied industries, government agencies and academic institutions. NAAREF's Professional Aerial Applicators' Support System (PAASS) program is a four-hour course offered annually at all state and regional agricultural aviation association conventions. The curriculum is brand new every year and a minimum of one hour of PAASS is focused on environmental professionalism. This ensures aerial applicators are kept up to date on the latest information related to making accurate applications and drift mitigation. Nozzle selection, buffer zones, inversions, precision application technology, dissection of real-life drift incidents, and proper spray boom setup are some of the environmental professionalism topics that have been covered in PAASS.

Five years after PAASS became part of the aerial application annual curriculum in 1999, there was a 26% drop in drift incidents according to Association of American Pest Control Officials drift surveys. In addition, ag aircraft accidents have also significantly declined. From 1999 to 2010, the accident rate per 100,000 hours flown dropped by 21.6% compared to pre-PAASS accident rates. From 2011 to 2019, the accident rate dropped even more—30.8%—compared to pre-PAASS accident rates. Each year we continue to see a drop in our accident rate since pre-PAASS days, but now it declines more incrementally. While aviation safety is the domain of the FAA and not the EPA, the reduction in accidents proves PAASS has had, and continues to have, a significant positive impact on the aerial application industry.

Another NAAREF program is Operation S.A.F.E. (Self-regulating Application & Flight Efficiency). The primary component of Operation S.A.F.E. is a fly-in clinic. At a S.A.F.E. fly-in, aerial applicators can have their aircraft calibrated and application patterns (both liquid and dry) measured and evaluated for accuracy and uniformity. Spray droplet size is also measured at a fly-in to ensure the agricultural aircraft is creating the droplet size required by the labels for products to be applied by the aircraft. Many of the concepts used mitigate the risk of drift from agricultural aircraft have originated from ideas first tested at Operation S.A.F.E. fly-ins.

Just last year, NAAA created a professional certification program for the aerial application industry named C-PAASS for Certified Professional Aerial Application Safety Steward. To be certified under C-PAASS aerial applicators must take the PAASS program annually and Operation S.A.F.E. biennially, in addition to belonging as a member to their state/regional agricultural aviation association and the NAAA. C-PAASS professionals are also required to take and be tested on additional aviation safety and environmental stewardship curriculum offered on-line through a learning management system software NAAA installed. The purpose of C-PAASS is to enhance professionalism in the aerial application industry as our statistics show that those that participate in our educational programs are safer from both an aviation and environmental perspective.

<u>Comments</u>

NAAA opposes the proposal to ban all conventional uses of ziram. The risks of concern to bystanders from drift from aerial applications as well as the occupational risks can be addressed by mitigations rather than canceling the uses.

Regarding the risk of drift, NAAA would first like to point out that the risk assessments for ziram were all conducted using the Tier 1 model in AgDRIFT and are artificially inflated because of the inaccuracy of the Tier 1 AgDRIFT model. NAAA encourages EPA to use the Tier 3 model in AgDRIFT instead of the Tier 1 for all risk assessments. EPA OCSPP leadership has publicly stated they intend to update their atmospheric modeling, referencing NAAA's suggested use of Tier 3 of the AgDRIFT model. This was also confirmed in the Herbicide Strategy update. Drift from aerial applications is more accurately estimated by using the Tier 3 model as proposed in a letter sent from NAAA to the Office of Pesticide Programs in June of 2020[8]. A recent field study conducted at the University of Arkansas concluded the drift estimates from the Tier 1 model were "greatly over-predicting" the amount of drift physically measured in the field study[9].

As an example of the difference in modeled drift between Tier 1 and Tier 3 with NAAA's parameters, the fraction of material applied 200 feet downwind from the edge of the application area to a terrestrial area is 0.0456 with the Tier 1 AgDRIFT model. When the Tier 3 model with all the assumptions described in NAAA's letter to the EPA are used, the fraction of applied material downwind from application area to a terrestrial area is 0.0261, a reduction of 43 percent.

As an additional mitigation towards reducing the risk of drift from aerial applications of ziram, NAAA recommends that the required droplet size be a coarse or larger. NAAA also recommends EPA require a 250-foot wind directional buffer adjacent to all people and buildings for aerial applications.

Regarding the occupational risks of concern to flaggers, NAAA recommends flaggers be prohibited for aerial applications of ziram. The entire aerial application industry now uses GPS for swath guidance. Human flaggers are neither used nor needed to make aerial applications.

The risks of concern to mixers and loaders can be addressed by requiring full PPE and a PF50 respirator when mixing and loading ziram for aerial applications. Additionally, NAAA recommends EPA ban the DF formulation of ziram and require the WDG and WSG formulations be put in a water-soluble bag.

To reduce the risks of concern to both pilots and mixer/loaders, NAAA suggests EPA limit both the application rate and daily acres treated for aerial applications of ziram. NAAA recommends a maximum application rate of 6.0 lb ai/A for aerial applications of ziram. NAAA suggests EPA limit aerial applications of ziram to a maximum of 100 acres per day.

Regarding the inhalation concerns to aerial applicators, NAAA feels that modern agricultural aircraft provide sufficient protection of pilots from pesticide exposure. Cockpits of modern agricultural aircraft are designed to protect the pilot from a multitude of occupational risks, including chemical exposure. The pilot sits in an enclosed cockpit located high on the aircraft, well above and slightly forward of the spray booms. The airflow over the wings pushes the

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[8] NAAA letter to EPA, June 29, 2020. https://www.agaviation.org//Files/Comments/EPA%20letter%20re%20AgDRIFT%20Tier%203%20aerial%20risk%20assessment%20use%2020200629.pdf

[9] Butts, T.R., B.K. Fritz, K.B. Kouame, J.K. Norsworthy, L.T. Barber, W.J. Ross, G.M. Lorenz, B.C. Thrash, N.R. Bateman, J.J. Adamczyk. 2022. "Herbicide spray drift from ground and aerial applications: Implications for potential pollinator foraging sources." Scientific Reports (2022) 12:18017. https://doi.org/10.1038/s41598-022-22916-4

spray droplets downward and away from the cockpit.

The cockpit is equipped with a recirculating air conditioning system with a foam sandwich air filter and only takes air from inside the cockpit itself. At the pilot's option, a fresh air vent can be opened to provide positive pressure ventilation to the cockpit. The intake for this fresh air vent is located high on the aircraft behind the cockpit where it is most likely to receive fresh air. With the doors and vents closed, the cockpit is sealed from direct entry of chemicals into the cockpit.

In addition to all of these protections, the high speed of an agricultural aircraft means it is constantly and rapidly moving away from the spray it is releasing. The only potential chance for the cockpit exterior to enter a spray cloud would be during an inversion which prevented fine droplets from being diapered. Because all new pesticide labels will prohibit applications during an inversion, the risk for this exposure is eliminated.

According to the March 1, 2013, EPA memorandum "Subject: Review of Agricultural Handler Exposure Task Force (AHETF) Monograph: Closed Cockpit Aerial Application of Liquid Sprays", inhalation exposure for aerial applicators was measured in the AHEFT studies using an OSHA Versatile Sampler (OVS) tube worn throughout the day. The OVS would therefore be collecting samples during a variety of other aerial applicator duties besides making the application in the enclosed cockpit, including but not limited to aircraft inspections, oversight of mixing and loading, refueling, and spray system maintenance. All of these additional activities will take place on the loading pad in the same vicinity as the mixing and loading activities. While NAAA admits to having no data, it hypothesizes that much of the inhalation exposure to aerial applicators comes from these activities, as opposed to the actual aerial application in the enclosed cockpit. To reduce inhalation exposure to pilots when they are performing these duties outside of the aircraft, NAAA recommends EPA require aerial applicators to wear a PF50 respirator when working outside of the aircraft on the mixing and loading site while ziram is being mixed and loaded.

Furthermore, 38% of the monitoring units (MU) included in the AHEFT monograph involved ultra-low volume (ULV) applications[10]. ULV applications rely on small droplet size in order to be effective[11]. These smaller droplet sizes could potentially increase the risk of inhalation to aerial applicators. This could have increased the overall inhalation unit exposure value determined by the AHEFT compared to if MUs were only from low and conventional application volumes. This possibility is supported by data from EPA's 2013 memorandum, which shows that the study with ULV applications had a higher average inhalation unit exposure than the other two recent studies. The only study with a higher average unit exposure than the ULV study was a much older study conducted in 1991, and all MUs in that study used the same type of aircraft[18], a model that is no longer in production and of which only 13 are currently being used in the U.S.[12] Since ULV applications of ziram are prohibited, the AHEFT data does not likely accurately

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[10] Barnekow, D. AHETF Administrative Chair. Personal Conversation March 21, 2024.
[11] Bonds, J. A. S. 2012. "Ultra-low-volume space sprays in mosquito control: a critical review". *Medical and Veterinary Entomology*. Volume 26, Issue 2 p. 121-130. https://resjournals.onlinelibrary.wiley.com/doi/10.1111/j.1365-2915.2011.00992.x
[12] Federal Aviation Administration Aircraft Registry. https://registry.faa.gov/aircraftinquiry/Search/MakeModelInquiry. Accessed April 1, 2024.

reflect inhalation exposure levels aerial applicators experience when making aerial applications of ziram.

<u>Conclusion</u>

NAAA opposes the ban on all conventional uses of ziram. The risk of drift to bystanders should be estimated with the Tier 3 AgDRIFT model. Additionally, a coarse or larger droplet size and 250-foot wind directional buffers near people and buildings should be required. Occupational risks can be mitigated by requiring PF50 respirators, eliminating the DF formulation, and limiting the maximum application rate and acres treated daily.

Thank you for this opportunity to comment.

Sincerely,

Andrew D. Moore
Chief Executive Officer