APPENDIX 4

Commenters:

1. California Rural Legal Assistance Foundation / Californians for Pesticide Reform (CRLA/CPR)
2. Beyond Pesticides (BP)
3. Ray Kapahi (RK)
4. Teleos Ag Solutions (TELEOS)
5. California Department of Food and Agriculture (CDFA)
6. Agricultural Organizations (AGORG)

Comment # 1	Response & Action
CRLA/CPR Thank you for the opportunity to comment on the draft first annual 1,3-D Report. We have the following concerns about the adequacy of the analysis and conclusion of this draft report. We also think that the 2024 1,3-D use data, in units of both total use and Adjusted Total Pounds (ATP), should have remained posted on the DPR website to facilitate public review of this and future annual reports. We ask that you put this data back up on the department website now and commit to keeping the 1,3-D use data, in units of both total use and Adjusted Total Pounds (ATP), posted going forward. It is especially important that the data for each year remains posted until the annual 1,3-D Report for that year has been finalized. Please understand that these comments are limited in scope to the annual report. We remain convinced that a regulation that is not based on protecting non-occupational bystanders to the OEHHA NSRL is fundamentally flawed.	An Excel file containing 1,3-D usage data for the period of January 1, 2024 to December 31, 2025 is currently available on the website for DPR's Air Program. The data includes per-application information on 1,3-D use and the associated ATP, among other information. Per 3 CCR 6626(g)(2), data will continue to be updated on a quarterly basis.
Comment # 2	**Response & Action**
CRLA/CPR **1. For the highest-use townships, the draft report fails to evaluate "the major factors affecting use levels and air concentrations".** The contents required in DPR's Annual 1,3-D report are set forth in 3 CCR 6448.4. Subsection (b)(2) of that regulation states that the report must include "an evaluation of the [ten highest-use townships] … determining the major factors affecting use levels and air concentrations." The draft report lists the ten highest-use townships in its Table 6**. However, the report does not evaluate what factors led to those townships having the highest ATP, and thus the highest risk of emissions. Potential factors include,**	While several of these factors were implicitly considered in the modeling of air concentrations in this township, we acknowledge they were not explicitly discussed in the report. We have added additional information regarding average application rates, number of applications, and crop types in the evaluation of factors affecting usage, whereas additional information on the application method distribution and winter versus non-winter split of 1,3-D usage within each township are additionally provided as part of the evaluation of factors affecting air concentration. These are the factors mostly directly affecting use and/or air concentrations for which DPR has reliable data.

but are not limited to, crops, soil types, weather patterns, geographically specific pest pressures, racial and ethnic disparities, and growers' need for training in alternative practices. Evaluating why 1,3-D use is high is an essential first step towards reducing use, in accordance with DPR's avowed commitment to sustainable pest management. DPR is compelled by the regulation to add the required evaluation to the draft report.	
Comment # 3	**Response & Action**
CRLA/CPR A separate requirement of 3CCR 6448.4(b)(2) is to estimate 1,3-D air concentrations within the ten highest-use townships for the highest 24-hour period, highest 72-hour period, and one-year average, "based on the reported use, available emissions data, and local weather conditions". The draft report does comply with that requirement in section 6.1.2, but only via modeling. Unfortunately, the report's estimates of air concentrations fail to use actual emissions data, because most of the ten highest-use townships lacked air monitoring stations. We address the need to expand and better target future air monitoring below in Section 3.2 of our comments. The lack of emissions data and the reliance on the model is especially problematic given that DPR's comparison of model output with monitoring data illustrates that the model consistently underestimated 1,3-D emissions in fields where monitoring showed air concentrations above 0.2ppb.	Please see our response to comment #11 regarding the absence of monitoring data in 2024's high-use townships. Note also that DPR is in the process of doubling the number of air monitoring stations in its Air Monitoring Network, from 5 currently to a total of ten by the end of 2027. Regarding the requirements described by of 3 CCR 6448.4(b)(2), "emissions" refer specifically to the mass of 1,3-D entering into the air per unit of treated surface area, rather than air concentrations (mass of 1,3-D per unit volume of air). All field-scale emissions data for soil fumigants are the result of modeling, or a combination of air concentration measurements and modeling, as it cannot be measured directly at the field scale. The presence of air monitoring locations in these townships would not eliminate the need for modeled emission data.
Comment # 4	**Response & Action**
CRLA/CPR **1.1 Discussion of trends in use by crop and fumigation method lacks key details** The draft report stresses that statewide use of 1,3 D in 2024 was lowest since 2009 in terms of both pounds and acreage. Table 3 however shows that the ATP for strawberries in all five years of the 2020-2024 time period exceeded the amount used in strawberries in 2019. This recent 5-year pattern of ATPs for strawberries significantly exceeding the 2019 ATP for the highest-use central coast crop should be discussed in the report. Evaluation of trends in use before planting other crops is also hampered by the high proportion of the total fumigations classified as "Preplant" in past years. The report should also state what the cutoff in total pounds, ATPs or acreage is for	Per 3 CCR 6448.4 and 6626(g), the purpose of the annual report is to provide a township-level analysis of 1,3-D usage and potential exposure, alongside a summary of use data. A statistical analysis of long-term trends in 1,3-D usage by crop fall outside of the scope of the report. Year-to-year usage can vary widely, and the report compares current use to the preceding five-year average as a result. DPR is working in collaboration with county agricultural commissioners to reduce use of the 'preplant' crop type where possible. Crops included in Table 3 are not subject to a specific cutoff, but rather the table is an accounting of the top five crop usage categories. We have clarified this in the updated report and expanded to include the top ten use sites

inclusion in Table 3 as a high-use crop. "Other" is the largest entry in 2024 and it would be informative to include information on other higher-use crops, such as walnuts, grapes and blackberries. Table 2 shows the Application factors for field fumigation methods but the emission ratios presumably used to calculate total emissions in Figure 1 are not provided in the report. Table 4, which lists ATP of 1,3 D for the highest use field fumigation methods (FFMs) includes only the TIF tarp chemigation method (FFM 1259). Figure 4 then shows that almost half of the 1,3 D ATPs used before planting strawberries in 2024 were applied using other methods. Summary information should be provided on what these other methods were.	The underlying emission ratios used in the development of the application factors in Table 2 can be found in the work of Brown (2022), cited in-text. Figure 4 includes data for the most commonly used application methods of 1,3-D, of which there are 26 currently allowed. Hence, its purpose is not to provide all data, but to clearly communicate the primary contributors. The complete dataset, including crop types and application methods for each application, is available on the webpage for DPR's Air Program.
Comment # 5	**Response & Action**
CRLA/CPR **2. For air concentrations that were higher than expected, the draft report fails to present actions that DPR will take to address the high levels.** A further requirement of 3 CCR 6448(b)(2) is: "If any of the estimated or monitored air concentrations are higher than expected in comparison to previous data, the report will include a description of action(s) the Department will take to address the high levels and a timeline for taking the actions." The draft report documents at least two instances when air concentrations were higher than expected: • **For Merced County's highest-use township, the estimated 95th-percentile annual average air concentration of 0.41ppb (Table 7); and** • The highest 24-hour air concentration, 7.19ppb, measured at the Shafter air monitoring station on 2/22/2024 (Table 5). For each of those, DPR should add a description of actions to address the unexpectedly high concentrations and a timeline for taking the actions. In the following paragraphs, we will explain why each of the two concentrations was higher than expected.	In response to the 95th-percentile average 1-year concentration of 0.41 ppb within township M07S12E, DPR conducted refined modeling to better understand the air concentrations within census-designated communities of the affected township. This refined modeling used actual field location data to model air concentrations within those communities (Brown & Zandvakili 2026). Because the way community boundaries are drawn can sometimes include large patches of open space or agricultural land, the analysis specifically evaluated 'developed' areas based on land cover datasets. The report predicted a maximum average annual air concentration of 0.25 ppb during 2024, well below the 70-year target for lifetime cancer risk of 0.56 ppb. Where estimated or monitored air concentrations are higher than expected in comparison to previous data, 6448.4 requires the annual 1,3-D report to include a description of action(s) the Department will take to address the high levels and a timeline for taking the actions. DPR does not consider the 24-hour 7.10 ppb air concentration measured at the Shafter air monitoring station on 2/22/2024 to be higher than expected. For a single 24-hour air monitoring sample, DPR considers 10 ppb or higher to be a high detection because it would contribute more than 70% of the 0.27 ppb monitoring threshold that triggers additional evaluation. (*See* https://www.cdpr.ca.gov/wp-content/uploads/2024/10/6e_luoanduyeda2023_hdmodeling.pdf).
Comment # 6	**Response & Action**
CRLA/CPR	

2.1 Merced County's highest-use township: the estimated 95th-percentile annual average air concentration of 0.41 ppb (Table 7) The highest **modeled 95th percentile average annual air concentration exceeds both the maximum expected in modeling conducted to support the rulemaking, and the air level that triggers further evaluation of air monitoring. The estimated 1,3-D concentration, 0.41ppb, is 117% of the 0.35 ppb level that was estimated as the maximum expected annual air concentration in an analysis which DPR conducted as part of the non-occupational bystander rulemaking.** The Initial Statement of Reasons (ISOR) for the non-occupational bystander rule states (page 16): "If the estimated air concentrations are higher than **previous estimates for regulation development or detected air concentrations, the report will describe the action(s) DPR will take to address the higher air concentrations." Because of this statement in the ISOR we conclude that the 2024 Annual Report should describe actions that DPR will take to address the 0.41ppb estimate.** The 0.41 ppb estimate is also 151% of the 0.27 ppb level that triggers further evaluation for air monitoring but not for modeling results under 3CCR 6448.4(b)(2). This high estimate is especially concerning given that DPR's modeling apparently is based only on reported use within a single township, and does not take into account the high use of 1,3-D in 3 contiguous townships. Further, attention earlier this year, DPR so far has failed to make any adjustment to the model. For all of these reasons, the estimated annual average air concentration of 0.41ppb was unexpected, and the draft report must comply with both 6448.4(b)(2) and the commitment DPR made in the ISOR statement quoted above and include actions to address it. Furthermore, DPR should make the model available and offer some supporting documents on how to use it, as CARB does for the Hot Spots Analysis and Reporting Program.	See response to comment 5 regarding Merced County's highest-use township. The 1,3-D annual report describes in section 6.1.2 (p. 14) the methodology used in DPR's modeling, referring to the modeling document from Luo 2022 ("Modeling for the township cap of 1,3-Dichloropropene applications, modeling approach #2"). This document clearly states the use of a 3x3 township modeling domain; hence, the modeling accounts for the influence of 1,3-D applications in the 8 townships surrounding townships on the air concentrations in the center township, in addition to the impact of those 1,3-D applications in the center township itself. The suite of AERMOD software products are already publicly available and may be downloaded for free from US EPA's website. US EPA additionally provides guidance on use of the model through a User's Guide, and periodically updates guidelines for its use in its Guidelines on Air Quality Models. For projects involving the use of AERMOD, DPR provides detailed technical reports describing the various input parameters and strives to describe modeling procedures in enough detail that the work could be reproduced.
Comment # 7	**Response & Action**
CRLA/CPR **2.2 The highest 24-hour air concentration, 7.19 ppb, measured at the Shafter air monitoring station on 2/22/2024**	

The peak 24-hour measured 1,3-D air level seems high when compared to local use data. The draft report discloses in Table 5 that the highest single 24-hour level measured in 2024 was 7.19 ppb. This level was measured at the Shafter Air Monitoring Network (AMN) Site on February 22 to February 23, 2024. We checked Kern County pesticide use records for nearby 1,3-D applications in that time period (verified later in data posted on DPR's website) and found that the only reported nearby 1,3-D applications were a 326.6 lb/ac application to a 34.5 acre field about 1 mile from the AMN site ending on February 17th and a 326.6 lb/ac application to a 24 acre field roughly 3 miles from the site ending on February 23rd. Both these applications were made using Field Fumigation Method (FFM) 1226 (24" deep injection / strip) prior to planting almond orchards. Data from use records are summarized in the table below. 1,3-D applications in the week before the 7.19 ppb air measurement in the area surrounding the Shafter AMN Site. [TABLE provided by CRLA/CPF] On November 4, 2024 Anne Katten sent an email to Minh Pham, Environmental Monitoring Branch Chief, expressing concern that these data indicated that emissions from the new 24" deep strip application method may not be as low as predicted, and that air levels closer to these applications in time and distance could have been much higher. Ms. Katten requested that DPR use modeling to estimate what 1,3-D level would be expected at the AMN site based on the reported amount of 1,3-D use in the surrounding area. Dr. Pham acknowledged receipt of the email. *On June 25th, 2025 Anne Katten received the following email response from DPR Deputy Director Madison Le:* "At this time, DPR does not intend to do additional analysis/report for the 7 ppb detection in Shafter. As background, DPR conducts site-specific modeling when air monitoring detects a high concentration. In the 2023 monitoring report (https://www.cdpr.ca.gov/wpcontent/uploads/2024/10/6e_luoanduyeda2023_hdmodeling.pdf), DPR defines a "high detection" of 1,3-D as a measured concentration greater than 10 ppb over a 24-hr sampling period. The 7 ppb detection in Shafter during 2024 is not considered a high detection. The cutoff value of 10 ppb represents extremely high	See response to comment 5.

values of 1,3-D measurements in the air monitoring network (>99th percentile)." In our opinion, limiting analysis to merely the highest 1% of measurements in the Air Monitoring Network is overly restrictive. DPR's refusal to evaluate why a 7ppb air concentration occurred despite only two 1,3-D applications using a newly developed "low emission" fumigation method within the previous week, each a mile or more away, is deeply troubling. DPR should have taken immediate steps to analyze the highest single 24-hour level measured in 2024, and should correct that error by conducting the further analysis and taking correcting action now. Corrective action is compelled by 6448.4(b)(2). The test in that regulation is whether "any…monitored air concentrations are higher than expected in comparison to previous data." DPR has not disputed our observation that the two 1,3-D applications in the prior week would not have been expected to result in a 24-hour reading of 7.19ppb on February 23, 2024. For all of these reasons, the measured 24-hour air concentration of 7.19ppb was unexpected, and the draft report must include actions to address it.	
Comment # 8	**Response & Action**
CRLA/CPR **2.3 Air concentrations increased between 2023 and 2024 at half of the air monitoring stations despite implementation of lower emission fumigation methods and decrease in 1,3-D use** Table 5 compares the highest 24-hour and one-year average 1,3-D concentrations at the six monitoring locations for 2024 but does not compare these concentrations to 2023 air concentrations. We checked and found that 2023 one-year average 1,3-D concentrations were lower than 2024 concentrations at the Delhi, Parlier and Santa Maria monitoring locations despite implementation of lower emission fumigation methods and decrease in 1,3-D use. Possible causes of these unexpected results should be discussed in the Annual Report. [TABLE provided by CRLA/CPF]	Air concentrations reflect a combination of many factors, including use patterns, spatial distribution of that usage relative to the air monitors, application methods, soil conditions, and meteorological conditions. In addition, a once-per-week sampling frequency means that estimates of annual averages are subject to some random effects depending on the days sampled. As a result, some year-to-year variation is expected, and a single year of data is generally insufficient to establish a trend. Our expectation is that the regulation will keep concentrations below those levels. Concentrations in 2024 were below the regulatory target concentrations, the 0.27 ppb monitoring threshold concentration, and screening level concentrations.
Comment # 9	**Response & Action**
CRLA/CPR **3. To truly evaluate the effectiveness of 1,3-D regulations, the draft report should go beyond the minimum requirements of 3 CCR 6448.4**	Comment acknowledged. Note that DPR is in the process of doubling the size of its Air Monitoring Network from the current five to a total of ten by the end of 2027.

Though not violations of 3 CCR 6448.4, there are at least two aspects of the draft report that simply are not adequate for determining whether 1,3-D regulations protect public health. Within the 2024 draft report, we urge DPR to expand its analysis to include additional high-use townships. In addition, for future reports, we urge DPR to expand and re-target monitoring of actual air concentrations.	
Comment # 10	**Response & Action**
CRLA/CPR **3.1 Expand the analysis of high-use townships.** 1,3-D use data show that limiting evaluation of 1,3-D use to the top township in each of the 10 top 1,3-D use counties does not adequately evaluate use trends. When the non-occupational bystander 1,3-D regulation was proposed, we commented that limiting evaluation of 1,3-D use and estimated 95th percentile air concentrations to the highest Adjusted Total Pounds (ATP) use township in each of the 10 highest ATP use counties would not accurately or adequately evaluate use trends. This proved to be the case in 2024 when four Merced County townships ranked among the 10 highest ATP use townships in the state. These 4 townships are contiguous in the northern area of the county (Delhi, Atwater, Livingston area) where sweet potato fields are concentrated. Two Fresno County townships also ranked in the top 10 highest ATP use townships in the state. It is also notable that multiple townships in the top 8 highest ATP use counties ranked higher than the highest ATP use township in either San Joaquin (rank 9) or Tehama (rank 10) county.	Comment acknowledged. The methodology used in modeling considers usage in adjacent townships, so the impact of any clusters of high-use townships on air concentrations in the center township is considered.
Comment # 11	**Response & Action**
CRLA/CPR **3.2 Expand and re-target future air monitoring for 1,3-D** As detailed below, DPR's air monitoring stations are not located in areas where use of 1,3-D was highest in 2024. This forces DPR and the public to rely exclusively on modeling for estimation of air concentrations to which the Californians who work and reside in high-use townships are exposed. - The Delhi air monitoring station is located in township M06S11E, which is just northwest of the highest use Merced County township M07S12E, which also ranked highest statewide in adjusted total pounds of 1,3-D use. The township containing the	

Delhi air monitoring station ranked 9th statewide in adjusted total pounds of 1,3-D use. - The Parlier air monitoring station is located in township M15S23E, which ranked 10th statewide in adjusted total pounds of 1,3-D use in 2024. Fresno Township M14S18E, which is over 24 miles west and slightly north of the Parlier township, ranked 3rd in adjusted total pounds of use. - The Shafter AMN station is located on the north edge of township M28S25E, which is about 12 miles south of the Kern township M26S25E with highest adjusted total pounds of use, which ranked 7th highest in the state. The township containing the Shafter AMN station ranks 21st in adjusted total pounds of 1,3-D use. - The Santa Maria AMN station is located in township S10N35W, which ranked 89th statewide as a fairly low use township, but is adjacent to Santa Barbara township S10N34W, which ranked 8th in adjusted total pounds of 1,3-D use for 2024, and close to township S10N33W, which ranked 18th statewide in adjusted total pounds of 1,3-D use. - The Oxnard AMN station is located in township S2N22W, which ranked 34th statewide for adjusted total pounds of 1,3-D use, was the highest ranking Ventura county township. Ventura has high historic use of 1,3-D but was not one of the top ten counties for 1,3-D use in 2024. - The Royal Oaks/ Watsonville AMN station is located in the township at the Monterey/Santa Cruz border which ranks highest for adjusted total pounds of 1,3-D use in Monterey County and 6th statewide. However, the Ohlone school site is not in the highest use part of the township and is not located in the valley or canyon area of Pajaro Valley, where higher concentrations of pesticides and other air contaminants are expected due to stagnant air conditions. For all these reasons, we urge DPR to expand and re-target future monitoring of 1,3-D air concentrations. Though modeling is useful, model estimates alone are not sufficient to truly evaluate the degree to which 1,3-D regulations are protecting public health, especially given DPR's reliance on a model that consistently underestimates higher concentrations.	The spatial distribution of 1,3-D use varies from year to year, such that the exact location of maximum use for the following year cannot be known in advance. Therefore, the placement of air monitoring stations is determined based on a trend of high use historically. In addition, the purpose of DPR's monitoring sites is to evaluate many different pesticides, and do not focus on 1,3-D specifically. Note also that site placement for air monitors prioritizes placement within Census-recognized communities containing schools, and the supporting analysis used prior to placement analyzes use within certain distances of that community, rather than usage within the entirety of its home township. In other words, the analysis supporting placement of air monitoring locations is designed with a different objective, and it is not expected that those locations consistently fall within those townships with the highest use statewide with each and every year. Given this, modeling is often the best tool available to estimate potential exposure in high-use townships.
Comment # 12	**Response & Action**
CRLA/CPR **Conclusions**	Your concerns and comments were addressed in our responses to comments #1-11.

The draft report fails to comply with 3 CCR 6448.4 in two regards: **1. For the highest-use townships, the draft report fails to evaluate "the major factors affecting use levels and air concentrations".** Evaluating why 1,3-D use is high is an essential first step towards reducing use, in accordance with DPR's avowed commitment to sustainable pest management. DPR should add the required evaluation to the draft report. **2. For air concentrations that were higher than expected, the draft report fails to present actions that DPR will take to address the high levels.** Those include: • For Merced County's highest-use township, the estimated 95th-percentile annual average air concentration of 0.41ppb (Table 7); and • The highest 24-hour air concentration, 7.19ppb, measured at the Shafter air monitoring station on 2/22/2024 (Table 5). For each of those unexpectedly high concentrations, DPR must add a description of actions to address them, and a timeline for taking the actions. In addition, to truly evaluate the effectiveness of 1,3-D regulations, the draft report should go beyond the minimum requirements of 3 CCR 6448.4. Within the 2024 draft report, we urge DPR to expand its analysis to include additional high-use townships. In addition, for future reports, we urge DPR to expand and re-target monitoring of actual air concentrations.	
Comment # 13	**Response & Action**
BP These comments are submitted on behalf of Beyond Pesticides. Founded in 1981 as a national, grassroots membership organization that represents community-based organizations and a range of people seeking to bridge the interests of consumers, farmers, and farmworkers, Beyond Pesticides advances improved protections from pesticides and alternative pest management strategies that eliminate a reliance on pesticides. Our membership and network span the 50 states and the world. We are writing in response to California Department of Pesticide Regulation's (DPR) draft annual report on 1,3-dichloropropene (1,3-D), "examining the effectiveness of its 2024 regulation in mitigating short-term acute and long-term cancer risks to residents and other non-occupational bystanders." While the results of the annual report show that	Comment acknowledged.

there “is no evidence at this time to suggest that additional regulatory actions are necessary” and that mitigation measures, including “acreage limits, minimum setback distances from an occupied structure to a treated field, totally impermeable films, deeper fumigant injections, an increase in soil moisture requirements, quarterly use summaries, and an annual report, among other requirements,” are effectively minimizing the release of 1,3-D into the air after its application in the soil, Beyond Pesticides urges that any amount of exposure to 1,3-D for farmers and bystanders is unacceptable based on the threats to both health and the environment, as well as the availablility of safer, effective alternatives. As the report shares, California is the largest producer of specialty crops in the U.S., “accounting for 99% of production of almonds and walnuts, and 90% of grapes and strawberries nationwide.” The use of soil fumigants, such as 1,3-D (also referred to as Telone), are used to control soil-borne pests, including soil nematodes and other soil pathogens, and is commonly applied as a pre-plant pesticide for trees, strawberries, grapes, carrots, sweet potatoes, and other crops in California. The fact that three-quarters of all U.S. fruits and nuts and one-third of all U.S. vegetables are grown in California means that all U.S. food eaters have a stake in how food is grown there, as these crops can contain pesticide residues with deleterious effects on health for not only consumers but also to the farmworkers, farmers, and communities of people exposed through nontarget chemical drift from farmland. As California DPR says: “1,3-D is a volatile organic compound listed as a carcinogen under California’s Proposition 65. 1,3-D is listed as a toxic air contaminant and exposure above certain thresholds can lead to serious illness, or death at especially high concentrations. 1,3-D is also listed as a restricted material and requires special handling due to its potential toxicity or environmental impact.” There is a wide body of research linking this broad spectrum soil fumigant to increased risks of numerous adverse public health and environmental impacts, including cancer, kidney and liver damage, leaching potential into ground and surface water, and posing toxic harms to birds, fish, and other aquatic organisms.	
Comment # 14	**Response & Action**
BP	

A case report article, published in *Frontier in Public Health*, documents a death from inhalation of the fumigant 1,3-D during work, resulting in acute renal (kidney) failure, hyperkalemia (high potassium levels in the blood), and brain edema (swelling). The chlorine-containing compound used in a greenhouse space entered the body of a 50-year-old man in China, being absorbed through the respiratory tract. While, in most cases, cause of death may be identified as organ failure, it may not be associated with chemical exposure due to limited diagnostic equipment and the period of time in which residue testing may have been done. Whether 1,3-D exposure is short-term or long-term, certain concentrations are harmful to the human body in a closed environment, like the greenhouse in this case. Absorption through the respiratory tract may allow the compound to cross the blood-brain barrier, depose in the brain tissue, then inhibit the central nervous system and cause diffuse brain tissue edema, leading to acute damage to the heart (including the vascular system), lung (respiratory), and renal function, eventually resulting in death.7 These health threats, among other concerns, are disregarded in the 2024 annual report, which is the first annual report that "checks compliance with the 1,3-D regional use limit (township cap) of 136,00 adjusted total pounds (ATP) temporarily in effect." As the report states: "In 2024, 7,008,972 pounds of 1,3-D were used on 43,736 acres statewide, corresponding to 4,053,244 ATP and 1,296,684 pounds of emissions. This is the lowest 1,3-D use and acreage since 2009... All townships complied with the township cap of 136,000 ATP, with the highest township having 113,628 ATP."	The purpose of the 1,3-D Annual Report is to provide for ongoing monitoring and verification that DPR's regulatory requirements address acute and cancer risks to non-occupational bystanders by tracking and evaluating 1,3-D use and air monitoring data. The report identifies and evaluates selected high-use townships in California and evaluates the air concentrations at DPR's 1,3-D monitoring stations. Therefore, this comment is out of scope of the annual report.
Comment # 15	**Response & Action**
BP The highest estimated air concentrations included in the reports show "26.8 ppb [parts per billion], 15.1 ppb, and 0.41 ppb for the 24-hour, 72-hour, and 1-year time periods, respectively," which are lauded as falling below DPR's "regulatory target concentrations of 55 ppb (72-hour average) and 0.56 ppb (70-year average)." These values, however, are well above the lifetime cancer risk exposure thresholds that the Office of Environmental Health Hazard Assessment (OEHHA) has set. OEHHA limits include 0.04 ppb per day for all people, while DPR has defined the lifetime cancer risk level as allowing for 14 times more	DPR compares air concentrations of 1,3-D to thresholds developed following the legal process required for toxic air contaminants (Food and Agricultural Code [FAC] sections 14023-14024). That process relies upon DPR's risk assessment, which like OEHHA's, has been peer-reviewed and is scientifically valid. The purpose of the 1,3-D Annual Report is to provide for ongoing monitoring and verification that DPR's regulatory requirements address acute and cancer risks to non-occupational bystanders by tracking and evaluating 1,3-D use and air monitoring data. The report identifies and evaluates selected high-use townships in California and evaluates the air concentrations at DPR's 1,3-D monitoring stations. DPR has complied with the regulation by including monitoring locations with air concentrations that exceed

exposure for most Californians or "residential bystanders."	applicable thresholds in the annual report. The selection of regulatory targets is outside the scope of this report.
Comment # 16	**Response & Action**
BP The mitigation measures promulgated by California DPR, including deeper fumigant injections and acreage limits, among others, are insufficient to protect farmworkers and those living near agricultural fields. Not only are mitigation measures ineffective due to enforcement challenges, but 1,3-D is such a volatile compound that DPR's own studies indicate that high 1,3-D concentrations at DPR's air-monitors originate from many miles away. Living amid chemical pollution creates the need for immediate mitigation measures to manage exposure. Mitigation measures, however, are often found to be lacking because of ongoing risks that may be reduced, but not eliminated, despite the availability of nontoxic practices that current policies do not require.	Those living near agricultural fields are considered nonoccupational bystanders and are protected by the same regulation (DPR 22-005) requiring issuance of the 1,3-D annual report. As required by 3 CCR 6448.4, townships with the highest 1,3-D usage will be evaluated on an annual basis and DPR will take action to address any air concentrations that are higher than expected. This requirement is in addition to continuous evaluation of monitoring data collected within communities located in high-use regions. Recent rulemaking (DPR 24-001) introduced additional regulations developed jointly and mutually with OEHHA for the protection of occupational bystanders. Additional annual reporting requirements listed under the occupational bystander regulations are found in CCR 6448.5
Comment # 17	**Response & Action**
BP Beyond Pesticides has a long history of advocating against the use of petrochemical pesticides, including 1,3-D. In previous comments to California DPR in 2023, we shared that the cancellation of 1,3-D was urgently needed, which is still the case today. This cancer-causing soil fumigant is highly prone to drift, with long-term air levels greatly exceeding the Proposition 65 Safe Harbor level at all of DPR's air monitoring network sites, with short-term spikes in air levels posing dangers to infants and the elderly. Other fumigants pose similar health hazards, as well as threats to California's environment and the planet. All should be cancelled and have their registrations withdrawn. Organic farmers in California do not require the use of such dangerous fumigants, demonstrating that the use of such extremely toxic chemicals is unnecessary and the risks are unreasonable.	Comment acknowledged.
Comment # 18	**Response & Action**
BP According to California Certified Organic Farmers (CCOF), a Department of Agriculture-accredited organic certifying agency and trade association located in Santa Cruz, California, "Californian organic farmers and ranchers produce 38% of all organic commodities sold in the United States." This	DPR recently released findings from an independent and peer-reviewed evaluation of alternatives to 1, 3-D from the California Council on Science and Technology (CCST) in March 2025 (https://www.cdpr.ca.gov/2025/03/13/dpr-releases-first-phase-of-state-funded-fumigant-alternatives-study-focused-on-13-d-and-chloropicrin/). The study found that there are currently no available 1:1 replacements to

incorporates 1,069,950 total acres of organic farmland, representing 21% of organic acreage across the country. California harvests tens of thousands of acres worth of organic crops based on California Department of Food & Agriculture's 2022-2023 California Agricultural Organics Report, including 6,741.28 acres of strawberries; 34,187.28 acres of grapes for wine, 12,897.87 acres of additional fresh grapes, and 8,706.38 acres of dried grapes for raisins; 41,058.71 acres of almonds; and 20,510.80 acres of carrots. This points to the viability of organic practices of the crops for which chemical-intensive farmers rely on 1,3-D. Without 1,3-D, DPR will incentive the market to increase the commercial availability of organic crops. Organic agriculture is a viable, productive alternative to the current regulatory system that assumes the need for pesticides due to chemical dependency. Despite this, the marketplace has responded to consumer demand, which has helped build a market valued at over $70 billion in the U.S. and over $230 billion globally. The global organic market is projected to grow to $564 billion by 2030. Widely adopted organic agriculture and land management is the long-term, holistic solution that is necessary to offer the proper protections required for health and the environment. As the only agricultural system with a requirement for a farm plan, inspections, and certification for compliance with organic standards, and rigorous public oversight, organic farming promotes sustainable, cost competitive, and profitable practices that enhance soil health and biodiversity. Organic is successfully mitigating the escalating public health, environmental, and climate crises. We urge California DPR to consider these alternative practices to adequately protect human health and the environment.	fumigants like 1, 3-D and that more research is needed. DPR's current annual grant solicitation has identified alternatives to fumigants as a priority area for funding: https://www.cdpr.ca.gov/spm-grants/spm-grants-program/
Comment # 19	**Response & Action**
BP DPR has a statutory and regulatory responsibility to protect the health of farmworkers, farmers, and their families—as well as neighboring communities—by stopping their routine exposure to this highly toxic pesticide, and to recognize unreasonable hazards and unacceptable elevated risk in the context of available organic management practices. It is no longer acceptable for DPR to accept or assume that chemical-intensive practices are required for	Recent rulemaking (DPR 24-001) introduced additional regulations developed jointly and mutually with OEHHA for the protection of occupational bystanders. Additional annual reporting requirements listed under the occupational bystander regulations are found in CCR section 6448.5

productive and profitable farming operations and mitigate hazards to unacceptable levels. The National Institutes of Health's PubChem database states: "Occupational exposure is likely to be through inhalation and via the skin. Irritation of the eyes and the upper respiratory mucosa appears promptly after exposure. Dermal exposure caused severe skin irritations. Inhalation may result in serious signs and symptoms of poisoning with lower exposures resulting in depression of the central nervous system and irritation of the respiratory system. Some poisoning incidents have occurred in which persons were hospitalized with signs and symptoms of irritation of the mucous membrane, chest discomfort, headache, nausea, vomiting, dizziness and, occasionally, loss of consciousness and decreased libido." The current annual report, as it pertains to residents and other nonoccupational bystanders, is not only deficient in applying the science, but it excludes farmworkers and their exposure. A pesticide regulation that is expressly designed to protect residential bystanders only, which excludes from its scope low-income Latinx people who work around treated fields, is a clear environmental injustice that must be corrected. This regulation falls far short of protecting farmworkers and other rural bystander workers and residents from hazardous levels of exposure to 1,3-D. We urge you to carefully reconsider the health and environmental threats posed by 1,3-D and other soil fumigants and eliminate their uses in California.	
Comment # 20	**Response & Action**
BP For decades, 1,3-D has harmed communities, particularly Latinx and Indigenous populations, who are disproportionately exposed to the pesticide. 1,3-D and other soil fumigants not only pose severe health threats to farmworkers and bystanders but also threaten soil and water ecosystems. They poison soil organisms that feed plants and sequester carbon. In contrast, organic production seeks to build healthy soils that resist plant pathogens, making fumigation unnecessary. Thus, these fumigants pose unreasonable adverse effects on humans and the environment and should be banned. Protecting people, communities, and ecosystems, central to DPR's statutory responsibility, requires the agency to regulate with the recognition that 1,3-D, as	Comment acknowledged.

a petrochemical pesticide, is directly contributing to daily health threats, biodiversity collapse, and the climate emergency. Addressing these aggregate threats must be central to DPR's responsibility to stop the disproportionate and elevated harm caused by 1,3-D to farm communities.	
Comment # 21	**Response & Action**
RK **Incorrect Acute Exposure (Introduction & Summary)** The DPR regulations set 55 ppb over 72 hours as the maximum concentration to protect non-occupational bystanders (people who live near agricultural field) from short-term (acute) concentration of 1,3-D. The Office of Environmental Health Hazard (OEHHA) defines acute to mean a single instance or brief duration of exposure such as a few minutes to a few hours. The duration used in OEHHA standards for acute REL for various toxic air contaminants (TACs) is 1-hour, not 3 days. Therefore, it is puzzling why DPR sought to use a 3 day exposure duration when the standard practice is to use 1 hour. A review of the OEHHA/ARB Consolidated Table of Approved Health Values also specify a 1-hour exposure for acute risk from inhalation3 when calculating public health risks. 1-hour concentrations can be much higher as compared to concentrations averaged over 72 hours for the same monitoring data. The workers are exposed to these higher, short-term concentrations, not the 72 hour averaged concentrations. DPR needs to establish a 1-hour acute standard for 1,3-D that protects workers from high, short-term concentrations. **Acute Exposure Substantially Understated (Details)** The regulatory target concentration of 55 ppb over 72 hours (Table 1 in the DPR Report) is designed to protect non-occupational bystanders from short-term exposure to high levels of 1,3-D concentrations. The report provides no rationale or discussion why a 72 hour (3 day) exposure duration was selected. The appropriate exposure duration needs to be 1-hour, the same duration OEHHA uses for hundreds of TACs. The relationship between a hypothetical pollutant monitoring data and averaging time is shown below. [FIGURE provided by RK] People living near agricultural fields would be exposed to the pollutant concentration shown in Figure 4-1(a); not the concentration depicted in	DPR's evaluation of the 1,3-D acute health risk is described in its 2015 Risk Characterization Document (RCD), which was peer-reviewed, including a review by OEHHA. Based on the RCD, and in consultation with OEHHA and other agencies, DPR issued the 2021 Risk Management Directive that specified an acute regulatory target concentration of 55 parts per billion (ppb) over 72 hours for non-occupational bystanders, as required by FAC section 14023(f).

Figure 4-1(d) that is much lower and is based on a 6 hour averaging time. In other words, the hypothetical concentrations in the original monitoring data that indicated peak concentration of 6.5 ppm were reduced to 2.75 ppm (Figure 4-1(d)). This represents a reduction of 57% when averaged over 6 hours and is solely due to increasing the exposure duration or averaging time. These results show how the concentrations recorded at a monitoring station (Figure 4-1(a)) decline when the same data is averaged over a longer period such as 15 minutes, 1 hour and 6 hours (Figures 4-1(c-d). These are hypothetical data not DPR monitoring data. The principle, however, would be the same for all monitoring data including the DPR monitoring data. The question is, what regulatory target concentration should be specified to avoid harm to nonoccupational bystanders who will be exposed to high concentrations over short periods not over 3 days. The DPR regulations provide no such standard.	
Comment # 22	**Response & Action**
RK **Paucity of Monitoring Data (Introduction & Summary)** DPR monitoring data is for only 6 sites while the report identified and evaluated 10 townships. Why the discrepancy? In addition, it is my understanding that monitoring data was for only 1 day per week. This means that DPR is basing their entire evaluation on less than 15% of possible data. It is standard practice when dealing with limited data, that the analysis quantify the uncertainty or reliability of the final results. This is especially true when you are trying to use the data for model validation. Are the validation results +/- 20%, 50% or ? No such information is presented. Given the enormous consequences attached with setting health protective standards, this is a critical oversight since it negates the purpose for which the regulation was intended. **Paucity of Monitoring Data (Details)** As noted in the Introduction, DPR did not provide any explanation as to why monitoring was limited to only 6 sites while the report identified and evaluated 10 townships where high levels of 1,3-D were used. When dealing with limited data, it is crucial that discuss how the use of limited data affects the reliability of the end results. It is standard to quantify the uncertainty caused by the use of limited data.	The number of monitoring locations operated by DPR at a given time relates to available funding and resources. DPR scientists evaluate past usage data and other factors to guide placement of these monitors in areas where air concentrations of soil fumigants and other agricultural pesticides are expected to be greatest. Monitoring in locations where the most pesticides are used optimizes limited resources and collects data for determining whether regulatory protections are functioning as intended. DPR is currently expanding its air monitoring efforts and collected public input as part of its site selection process so that by the end of 2027 there will be 10 sites in its air monitoring network. The evaluation of 10 townships is a requirement of 3 CCR 6448.4(b). This is explained in sections 2 and 3 of the draft report. DPR monitoring sites are selected based on past usage data for many different pesticides, and existing monitoring sites may not include the highest use townships for 1,3-D in a given year. The modeling of air concentrations within these townships thereby allows DPR to evaluate potential air concentrations in townships without a monitor. DPR acknowledges that monitoring and modeling results are subject to inherent uncertainty. As noted, monitoring data is collected 1 day per week, whereas air dispersion models can

This is done by reporting the results as having an error of+ or - ? %. Given, the wide-ranging implications for worker's health and safety of DPR regulations, this is a critical oversight.	simulate concentrations for every day of a year. While DPR does not attempt to estimate uncertainty related to sampling frequency directly, modeling tools are deployed to estimate the full daily concentration record in cases where monitored values exceed certain trigger thresholds. Uncertainty in DPR's modeling approach is addressed in the technical document for DPR's modeling, "Updated 1,3-dichloropropene monitoring data and its impact on the previous model evaluation" by Y. Luo, dated 6/25/2025, and demonstrates that AERMOD captures the average of monitored concentrations within a factor-of-two around 88% of the time. Note that analytical uncertainty is also present in monitoring results and is addressed as part of the quality control and assurance data in annual reports for DPR's Air Monitoring Network and Study 309 ("Monitoring of 1,3-Dichloropropene in Fresno and Merced Counties"), available in the reports directory on DPR's website.
Comment # 23	**Response & Action**
RK **Model Bias Towards lower Results (Introduction & Summary)** A comparison of modeling results with actual monitoring data shows a consistent bias towards lower concentrations. No discussion or acknowledgement appear in the DPR report. **Modeling Results Biased Towards Lower Concentrations (Details)** A comparison of modeling results with actual monitoring data (Figure 1 in DPR Report issued 6/25/2025) shows a consistent bias towards lower concentrations. No explanation is provided for this systemic bias and how modeling results should be changed to correct this bias.	DPR's modeling of acute and annual concentrations in the 1,3-D annual report utilizes the 95th percentile of model predictions. The general methodology is described in the DPR report "Modeling for the township cap of 1,3-Dichloropropene applications, modeling approach #2", published 9/12/2022, and citation of this report is included in-text within the 1,3-D annual report. Modeled concentrations were evaluated at 1369 locations across the township under multiple iterations of randomized source locations, and the 95th percentile selected as a conservative estimate of air concentrations within the township. There were both underestimation and overestimation in Figure 1 (DPR Report issued 6/25/2025), not "*a consistent bias towards lower concentrations*" as summarized by the reviewer. Statistics for evaluating the model performance were provided in the next table of the same document: up to 88% of the monitoring data points have been well captured by the modeling results. In accordance with Health and Safety Code 56004, the modeling tools (AERFUM/AERMOD) and the validation with 1,3-D measurements have been peer-reviewed by external scientists through the Interagency Agreement by California EPA and the University of California, Berkeley.
Comment # 24	**Response & Action**
RK **Presentation of Risks to Workers and the community** The DPR report presents the monitoring and modeling data in terms of concentrations (ppb). The results should be shown in terms of cancer risk and	Monitoring and modeling results are placed in context of a monitoring threshold for initiating further scientific review and evaluation and/or regulatory target concentrations in sections 5.1 and section 6.1.2, respectively. The report states

acute hazard index which is the standard metric used to communicate the hazard from acute exposure. Without any context, the public has no sense of what the concentration numbers mean. For example, if the annual concentration of 1,3-D is 25% below the annual average of 0.27 ppb (Table 1 in DPR Report), what is the cancer risk to people living near agricultural fields?	that both measured and modeled data are below the acute and cancer-risk regulatory target concentrations. Per 3 CCR 6448.4(b), the scope of the 1,3-D annual report is to assess the major factors affecting use levels and air concentrations, and to determine whether air concentrations fall within an expected range.
Comment # 25	**Response & Action**
TELEOS Teleos Ag Solutions (Teleos) appreciate the opportunity to comment on the California Department of Pesticide Regulation's (CDPR's) Draft Annual Report examining the effectiveness of CDPR's 22-005 Regulation, mitigating short-term acute and long-term cancer risks to residents and other non-occupational bystanders from 1,3-Dichloropropene (1,3-D). We strongly support the protection of California communities and the environment. Teleos provides agricultural communities with soil solutions to manage pests such as nematodes to produce healthful fruits and vegetables for California and beyond. Please consider the attached comment document on CDPR's Draft Report. Thank you for the opportunity to provide comments on the Draft Report. Product stewardship is of highest importance at Teleos, and we look forward to working with CDPR on continuous efforts to provide California with safe, effective, and sustainable pest management. Teleos Ag Solutions concurs that there are no concerns for long-term residents in the same areas and the information presented in the draft CDPR 2025 report represents high use areas and conservative approaches for air modeling.	Comment acknowledged.
Comment # 26	**Response & Action**
TELEOS **<u>Summary:</u>** The California Department of Pesticide Regulation (CDPR) 1,3-Dichloropropene (1,3-D) draft Report for 2024 (October 2025) modeled air concentrations of 1,3-D in the 10 highest use townships in each of the ten highest use counties in California. The draft report concluded that the purported cancer risk based on these modeling results to residents and other non-occupational bystanders were within the requirement of CDPR Regulation 22-005. Monitoring data included	Comment acknowledged.

in the report also supports this finding. These results indicate that the current regulatory requirements are functioning as intended and that no additional actions are necessary to meet the requirements of Regulation 22-005. The authors of this report and their sponsor, Teleos Ag Solutions, concur with the conclusions reached in the report. The information provided in the CDPR 2025 report summarizing information from the 2024 use season supports the comments and information provided by Dow (Salt Lake Holdings) in its 24 January 2025 submitted comments regarding the health-based proposed mitigations for occupational bystanders. This is based on air monitoring network data and intentionally conservative modeling approaches reflecting actual use patterns in high use townships across the geographic range of California. The results indicate that in no circumstance did 1,3-D concentrations exceed established regulatory target concentration for different key durations of exposure considered in California rulemaking. Additionally, in Appendix 1 of these January 2025 comments Pesticide Use Report data were analyzed to show that most treatments to grapes, almonds and walnuts in the inland counties were to less than 40 acres. Section 4.1 of the 2024 season summary report also confirmed that reported treatments in excess of 80 acres was an artifact of reporting combined multiple smaller spatially and temporally separated applications and not the result of violation of the 80 acre maximum treatment restriction.	
Comment # 27	**Response & Action**
TELEOS **<u>Supporting Data Presented in Section 4 of the 2024 Season Report:</u>** In the draft CDPR 2025 report summarizing the 2024 use season several sources of data/information were presented. In the draft CDPR 2025 report, these include (some are included here for clarity) regulatory air concentration thresholds (Table 1 excerpted/presented below), information on application factors used to account for differing emission factors for different methods (Table 2), annual pounds applied (adjusted and non-adjusted) and associated emissions summarized in Figure 1, acres treated (excerpted/presented below including narrative text) in Figure 2, and various other presentations of use data permeated by crop type	Comment acknowledged.

and FFM in the remaining elements of Section 4 of the draft report. [FIGURE provided by Teleos] **Monitoring Data Presented In the Draft 2024 Season Report:** As noted in the draft report, CDPR has 6 monitoring stations located in various counties across the state that monitor 1,3-D and other pesticides. These results are presented in Section 5.1 and Table 5 of the draft CDPR report. The highest 95th percentile one year air concentrations in the highest use almond counties were Kern, Stanislaus, and San Joaquin with FFM 1226. The soil pre-plant highest county was Tehama with FFM 1224. Both of these application methods are non-tarped, 24 inch deep, broadcast and strip methods, respectively. The narrative and summary table from the draft report are excerpted below for clarity. Results indicate for all durations concentrations did not ever exceed the regulatory evaluation triggers or target concentrations. [FIGURE provided by Teleos] Note that 4 of the 6 monitoring locations were also in counties that included townships selected for modeling purposes described below which indicates the samplers were likely located in proximity to high use areas.	
Comment # 28	**Response & Action**
TELEOS **Modeling Results Presented In the Draft2024 Season Report:** The modeling process identified 10 highest use counties across the state and their highest use township and crop. Highest use almond counties were Fresno, Kern, Stanislaus, and San Joaquin with FFM 1226. The soil pre-plant highest county was Tehama with FFM 1224. Merced county also had a high use level for sweet potato also with FFM 1224. Modeling approaches seem appropriate given an established variant of EPA's AERMOD was utilized but particular parameterization could not be verified. As shown in Table 7 of the draft report (excerpted below) the 1-year 95th percentile air concentrations ranged from 0.09 ppb in San Joaquin to 0.41 ppb in Merced counties, respectively. These air concentrations are upper bound values in that they are 95th percentiles based on the modeling constructs rather than averages used in cancer	Comment acknowledged.

exposure and risk assessments and the models used were parameterized using information intended to represent the highest use areas rather than average use areas of the 2024 season which makes the approach inherently conservative, by compounding the conservatism of multiple 'worst-case' assumptions. [FIGURE provided by Teleos]	
Comment # 29	**Response & Action**
TELEOS **<u>Discussion and Conclusions:</u>** It is also important to recognize that, on a retrospective basis, refined modeling opportunities exist which would improve the accuracy and representativeness of air concentration estimates. As acknowledged by CDPR, the ATP use data were evaluated to identify the highest use counties and then the highest use townships within the county. CDPR states that the modeling follows the "township cap" modeling approach utilized previously. As presented in Luo, 2022, (www.cdpr.ca.gov/wp-content/uploads/2024/10/5-modeling_for_the_township_cap_of_1-3-d_approach_2.pdf), the authors acknowledge that the exact field locations (and dimensions) are not known exactly, and are only known at the section level (i.e., within 1 sq. mile). So, the AERFUM program randomly assigns 10 potential locations within the section to represent possible field locations. The model is then executed with numerous iterations of random field locations and local weather and the 95th percentile of the 1,3-D concentration distribution in air is determined. See the excerpt from Luo, 2022, below in italics: [EXCERPT] It should be noted that although the modeling results are expected to be similar from a township cap perspective, since the township cap is based on the annual cumulative township wide emissions, the model results near treated fields could be significantly affected by using more precise application locations.	Comment acknowledged.
Comment # 30	**Response & Action**
TELOES **<u>Discussion and Conclusions:</u>** Teleos appreciates that CDPR recognizes the opportunity to refine and improve the model as new GIS data on field locations and dimensions are available. While CDPR suggests that their	Comment acknowledged. DPR will consider this feedback in cases where refined modeling is warranted.

'randomization' approach is expected to be similar to refined AERFUM modeling, it should be evaluated further via refined modeling. Finally, an opportunity also exists to refine and reduce uncertainty in the modeled exposure of residential bystanders, by determining the actual geospatial location of residential buildings in these high-use townships and placing the modeling receptors at these location. This would more closely associate the resulting air concentration distributions to exposure that may be encountered by residents in these high-use townships. For example, the Microsoft Building Footprints dataset ("MBF") includes 11,542,912 building footprints in California. (blogs.bing.com+2hub.arcgis.com+2) that could be incorporated into CDPR's AERFUM modeling framework, and reduce uncertainty relative to air concentrations near treated fields. The proximity of Telone use areas to population centers could also be informed and refined using US census tract data. US census data were used to inform the population surveyed in the residency mobility study and associated modeling (Driver et al., 2016a, 2016b, van Wesenbeeck et al. 2016) which showed that, on average, residents lived in two high-use areas (Merced Co., representing central valley agriculture and Ventura Co., representing coastal agriculture) for 22-27 years, indicating that residents would not be exposed for an assumed 70-year lifetime. Teleos suggest that these refinements are incorporated into the exposure and risk assessment for 1,3-D. Additional information on the Microsoft building footprint database (BFD) is shown in Appendix A: **<u>Appendix A</u>** 1. What the Microsoft building footprint database is • Microsoft used imagery (via Bing Maps, commercial satellite/air imagery) and applied deep-learning computer-vision (semantic segmentation + polygonization) to detect building footprints (i.e., 2D polygons of building outlines) globally (and regionally) and some associated attributes (e.g., confidence score, height estimates). GitHub+4GitHub+4planetarycomputer.microsoft.com +4 • These footprints are released under an open license (specifically the Open Data Commons Open Database License — ODbL). GitHub+2wiki.openstreetmap.org+2	

• The dataset logs include which imagery vintage the footprints derive from; e.g., in USA many footprints from 2019-2020 imagery. GitHub+1 2. What the dataset contains & key features • Footprint polygon geometries (for each building) • Metadata fields: confidence score, capture date (where available), height estimates (in many cases) GitHub+1 • Format: GeoJSONL / compressed CSV / shapefile depending on version. The global dataset uses geojsonl inside CSV-gz. GitHub+1 • Coordinate system: EPSG:4326 (latitude/longitude) for many of the releases. GitHub+1 • Coverage: Initially the U.S.; then Australia; then global. For example: 11.8 M in Canada (as of that release) and others. blogs.bing.com+1 • License: ODbL — meaning it's open but subject to share-alike or database conditions (you must attribute and share derivative databases under same terms). GitHub 3. Accessing & downloading the data • The GitHub repo "microsoft/GlobalMLBuildingFootprints" provides download links and details. GitHub • For the U.S., "microsoft/USBuildingFootprints" on GitHub contains ~129 million footprints. GitHub • The dataset is also available via the Microsoft Planetary Computer dataset catalog: e.g., the dataset page "Microsoft Building Footprints" on the Planetary Computer portal. planetarycomputer.microsoft.com • Note: File sizes can be very large (gigabytes) depending on region. You may need to split or process in chunks. For example, one blog shows splitting into smaller files to handle large country data. geodose.com • GIS import: Since it's GeoJSON or geojsonl → you can use QGIS / ArcGIS / Python (GeoPandas) to load. Some users suggest using filtering by area of interest to reduce size. googlemapsmania.blogspot.com+1	