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MEMORANDUM

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DATE: June 7, 2023

SUBJECT: PRELIMINARY ESTIMATES OF VOLATILE ORGANIC COMPOUND  
EMISSIONS FROM PESTICIDES IN THE SAN JOAQUIN VALLEY:  
EMISSIONS FOR 2021

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**SUMMARY**

This document summarizes the preliminary volatile organic compound (VOC) emissions inventory for the San Joaquin Valley (SVJ) nonattainment area (NAA) based on data reported to or produced by the California Department of Pesticide Regulation (CDPR) from May 1 to October 31, 2021, the peak ozone season in California.

Preliminary estimates show that emissions from pesticides decreased 13% (-1.938 tons/day (tpd)) between 2020 and 2021, from 14.987 to 13.049 tpd. Emissions were 24% (-4.146 tpd) below the regulatory trigger level of 17.2 tpd, which is 95% of the SIP goal of 18.1 tpd. Fumigant emissions decreased 20% (-0.784 tpd), from 3.902 to 3.117 tpd. Emissions from nonfumigant products decreased 10% (-1.154 tpd), from 11.086 to 9.932 tpd.

In 2013 CDPR's emissions inventory for the SVJ NAA exceeded the trigger level, resulting in the restriction of certain uses of high-VOC products in 2015. The hypothetical emissions for 2019 exceeded the trigger level, and restrictions continue through at least 2022. Final hypothetical emissions in 2020 and preliminary hypothetical emissions in 2021 are lower than the trigger level. Per Title 3 California Code of Regulations (3 CCR) section 6884(c), DPR's 2021 annual report must make a final estimate of 2021 hypothetical emissions before determining whether to lift these restrictions for May 1 - October 31, 2023.

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## **VOLATILE ORGANIC COMPOUND INVENTORY RESULTS: SAN JOAQUIN VALLEY**

Pesticide Use Report (PUR) data for the San Joaquin Valley (SJV) nonattainment area (NAA) were obtained from the PUR database on September 8, 2022, to produce the preliminary volatile organic compound (VOC) emissions estimates for 2021 and update estimates for 2016 to 2020. Unless otherwise stated, all VOC emissions from fumigants are reported as adjusted emissions.

In this report “total emissions” refers to the sum of emissions from all applications (within the NAA and between May 1 and October 31 of a given year). Other categories for which emissions are totaled, or aggregated, include pesticide type (i.e., fumigant or nonfumigant), product formulation (e.g., liquid concentrate), active ingredient (AI), etc. More specific emissions aggregates are often reported in text and tables as a percentage of some less specific emissions aggregates. For example, emissions from individual fumigant AIs are reported as a percentage of fumigant emissions and of total emissions. Other metrics reported in the text and tables are the “change” in emissions between adjacent years, the “percent change” in emissions (i.e., change divided by emissions in the earlier year).

CDPR requests that registrants provide thermogravimetric analysis (TGA) data for new and existing products subject to the VOC data requirements. TGA data are used to determine a product’s emission potential (EP), the fraction of a product that is assumed to contribute to atmospheric VOCs. Previous inventories have shown that changes in a widely used product’s EP can significantly impact the emissions inventory. Table 1 shows the nonfumigant products with EP values that changed as a result of (a) error corrections; (b) the Assembly Bill (AB)1011 process; or (c) TGA data submission. The AB1011 process allows CDPR to consider previous data evaluations to support new and amended pesticide product registrations and to maintain product registrations. Table 1 also includes the resultant changes in VOC emissions for these products.

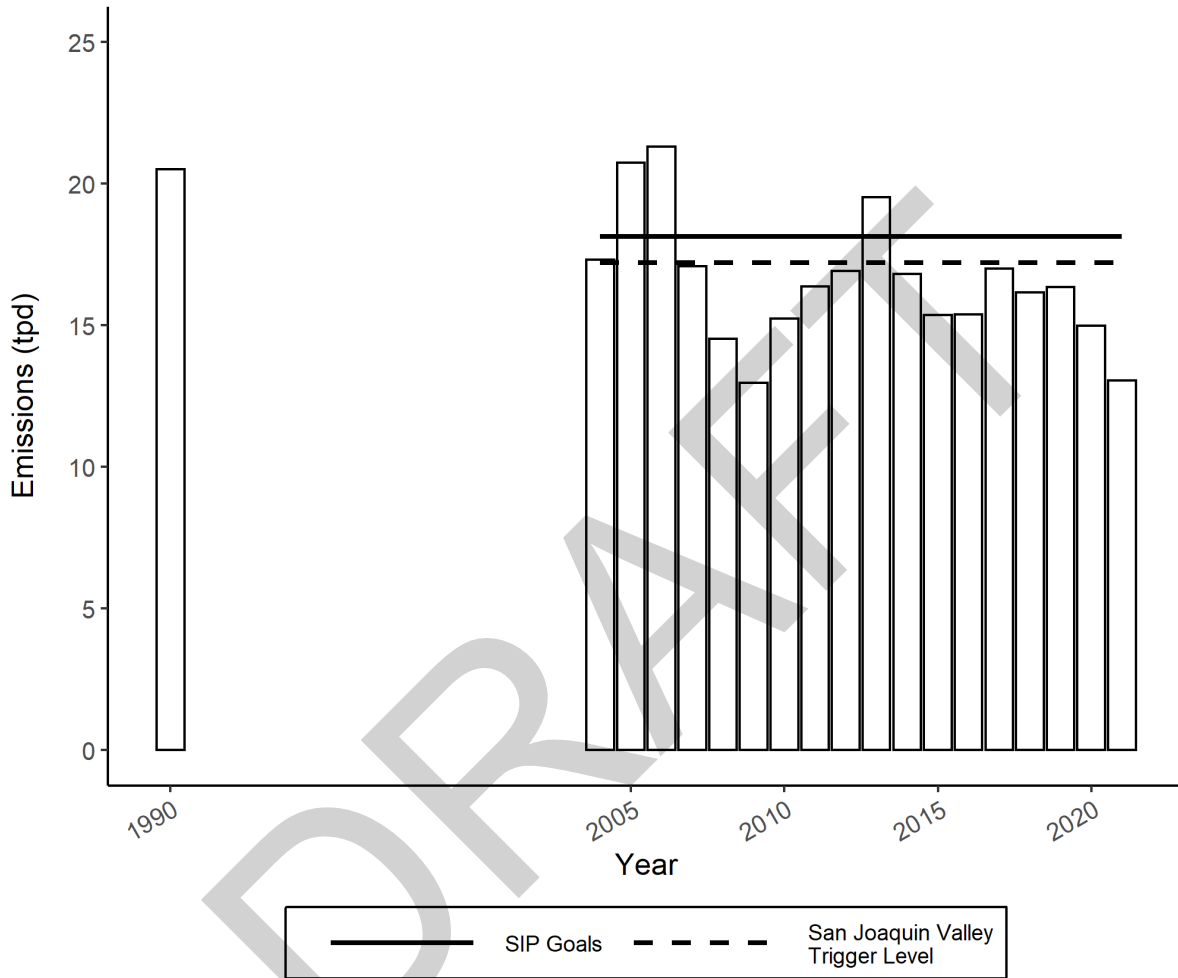
**Table 1:** Change in emissions (tpd) in 2021 in the SJV NAA attributable to changes in EP for nonfumigant products. Excludes formulation changes for products with a formulation-default EP.

Product	Registration Number	2021 Method	2020 Method	2021 EP	2020 EP	2021 Applied Mass (tpd)	Change in Emissions (tpd)
EMBED	62719-634-AA	Derived	Default median	0.04	5.71	0.003	>-0.001
GOVEE	89167-90-AA-89391	Derived	Default median	73.09	5.71	0.006	0.004

Preliminary estimates show that emissions from pesticides decreased 13% (-1.938 tons/day (tpd)) between 2020 and 2021, from 14.987 to 13.049 tpd. Emissions were lower than in any year since 2009. Emissions were 24% (-4.146 tpd) below the regulatory trigger level of 17.2 tpd, which is 95% of the SIP goal of 18.1 tpd (Table 2, Figure 1).

**Table 2:** Total emissions in the SJV NAA. Changes and percent changes are from previous year.

Year	Total Emissions (tpd)	Change (tpd)	Percent Change
2021	13.049	-1.938	-13%
2020	14.987	-1.361	-8%
2019	16.348	0.185	1%
2018	16.163	-0.841	-5%
2017	17.004	1.621	11%
2016	15.383	0.014	<1%
2015	15.368	-1.447	-9%
2014	16.815	-2.705	-14%
1990	20.517		



**Figure 1:** SIP Goal, regulatory trigger, and total emissions in the SJV NAA.

Fumigant emissions decreased 20% (-0.784 tpd), from 3.902 to 3.117 tpd. Fumigants represented 24% of emissions and 40% of the change in emissions. Emissions from nonfumigant products decreased 10% (-1.154 tpd), from 11.086 to 9.932 tpd. Nonfumigants represented 76% of emissions and 60% of the change in emissions (Table 3).

**Table 3:** Fumigant and nonfumigant emissions in the SJV NAA.  
 Changes and percent changes are from previous year.

Year	Category	Emissions (tpd)	Percent of Total Emissions	Change (tpd)	Percent Change
2021	Fumigant	3.117	24%	-0.784	-20%
2021	Nonfumigant	9.932	76%	-1.154	-10%
2020	Fumigant	3.902	26%	-0.524	-12%
2020	Nonfumigant	11.086	74%	-0.837	-7%
2019	Fumigant	4.426	27%	0.475	12%
2019	Nonfumigant	11.923	73%	-0.290	-2%
2018	Fumigant	3.951	24%	-0.268	-6%
2018	Nonfumigant	12.212	76%	-0.572	-4%
2017	Fumigant	4.219	25%	-0.018	>-1%
2017	Nonfumigant	12.785	75%	1.639	15%
2016	Fumigant	4.237	28%	-0.540	-11%
2016	Nonfumigant	11.146	72%	0.555	5%
2015	Fumigant	4.777	31%	0.752	19%
2015	Nonfumigant	10.591	69%	-2.198	-17%
2014	Fumigant	4.026	24%	-0.327	-8%
2014	Nonfumigant	12.789	76%	-2.378	-16%
1990	Fumigant	5.536	27%		
1990	Nonfumigant	14.981	73%		

There were eight fumigant product formulations. The liquid concentrate formulation accounted for 70% of fumigant emissions and 82% of the change in fumigant emissions (Table 4).

**Table 4:** Fumigant formulation emissions in the SJV NAA in 2021.  
 Changes and percent changes are from previous year.

Formulation	Emissions (tpd)	Percent of Total Emissions	Percent of Fumigant Emissions	Change (tpd)	Percent Change
LIQUID CONCENTRATE	2.195	17%	70%	-0.645	-23%
PRESSURIZED GAS	0.504	4%	16%	>-0.001	>-1%
PRESSURIZED LIQUID/SPRAYS/FOGGERS	0.316	2%	10%	-0.141	-31%
EMULSIFIABLE CONCENTRATE	0.077	<1%	2%	0.016	26%
SOLUTION/LIQUID (READY-TO-USE)	0.017	<1%	<1%	-0.020	-54%
GRANULAR/FLAKE	0.008	<1%	<1%	0.006	313%
DUST/POWDER	0.000	0%	0%	0.000	-
DRY FLOWABLE	0.000	0%	0%	0.000	-

There were 18 nonfumigant product formulations. The emulsifiable concentrate and liquid concentrate formulations accounted for 68% of nonfumigant emissions and 90% of the change in nonfumigant emissions (Table 5).

**Table 5:** Nonfumigant formulation emissions in the SJV NAA in 2021.  
 Changes and percent changes are from previous year.

Formulation	Emissions (tpd)	Percent of Total Emissions	Percent of Nonfumigant Emissions	Change (tpd)	Percent Change
EMULSIFIABLE CONCENTRATE	4.483	34%	45%	-0.488	-10%
LIQUID CONCENTRATE	2.241	17%	23%	-0.553	-20%
OIL	0.710	5%	7%	-0.051	-7%
SUSPENSION	0.589	5%	6%	-0.017	-3%
FLOWABLE CONCENTRATE	0.564	4%	6%	0.040	8%
GRANULAR/FLAKE	0.539	4%	5%	0.067	14%
OTHER (LIQUID)	0.408	3%	4%	-0.082	-17%
PRESSURIZED LIQUID/SPRAYS/FOGGERS	0.115	<1%	1%	-0.009	-8%
WETTABLE POWDER	0.111	<1%	1%	>-0.001	>-1%
PELLET/TABLET/CAKE/BRIQUET	0.074	<1%	<1%	-0.028	-27%
DUST/POWDER	0.049	<1%	<1%	-0.015	-23%
DRY FLOWABLE	0.018	<1%	<1%	-0.009	-34%
SOLUTION/LIQUID (READY-TO-USE)	0.014	<1%	<1%	-0.008	-37%
MICROENCAPSULATED	0.006	<1%	<1%	<0.001	1%
SOLUBLE POWDER	0.006	<1%	<1%	-0.003	-30%
PRESSURIZED DUST	0.003	<1%	<1%	0.001	62%
OTHER (DRY)	0.001	<1%	<1%	>-0.001	-13%
PRESSURIZED GAS	<0.001	<1%	<1%	<0.001	-

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Fumigant product emissions stem from six AIs and inert ingredients. 1,3-dichloropropene accounted for 44% of fumigant emissions and 60% of the change in fumigant emissions (Table 6).

**Table 6:** Fumigant primary AI emissions in the SJV NAA in 2021.  
Changes and percent changes are from previous year.

Primary AI	Emissions (tpd)	Percent of Total Emissions	Percent of Fumigant Emissions	Change (tpd)	Percent Change
1,3-DICHLOROPROPENE	1.357	10%	44%	-0.469	-26%
POTASSIUM N-METHYLDITHIOCARBAMATE*	0.599	5%	19%	-0.066	-10%
METHYL BROMIDE	0.477	4%	15%	0.010	2%
CHLOROPICRIN	0.323	2%	10%	-0.152	-32%
METAM-SODIUM*	0.195	1%	6%	-0.075	-28%
INERTS	0.159	1%	5%	-0.039	-20%
DAZOMET*	0.008	<1%	<1%	0.006	313%

\* These ingredients degrade in the field to form the actual fumigant AI and VOC known as methyl isothiocyanate (MITC).



There were 577 nonfumigant primary AIs. The share of emissions is more evenly distributed for nonfumigant than fumigant AIs: the top 10 AIs accounted for 52% of nonfumigant emissions and 49% of the change in nonfumigant emissions (Table 7).

**Table 7:** Top 10 nonfumigant primary AI emissions in the SJV NAA in 2021.  
 Changes and percent changes are from previous year.

Primary AI	Emissions (tpd)	Percent of Total Emissions	Percent of Nonfumigant Emissions	Change (tpd)	Percent Change
GLYPHOSATE, ISOPROPYLAMINE SALT	0.808	6%	8%	-0.053	-6%
MINERAL OIL	0.721	6%	7%	-0.026	-4%
GLUFOSINATE-AMMONIUM	0.668	5%	7%	-0.298	-31%
BIFENTHRIN	0.663	5%	7%	-0.080	-11%
ABAMECTIN	0.594	5%	6%	-0.138	-19%
HEXYTHIAZOX	0.487	4%	5%	-0.036	-7%
OXYFLUORFEN	0.402	3%	4%	-0.060	-13%
CLETHODIM	0.338	3%	3%	0.048	16%
METHOXYFENOZIDE	0.268	2%	3%	-0.007	-2%
ASPERGILLUS FLAVUS STRAIN AF36	0.247	2%	2%	0.082	50%

There were 88 commodities treated by fumigant products. The top 10 commodities accounted for 83% of fumigant emissions and 80% of the change in fumigant emissions (Table 8).

**Table 8:** Top 10 fumigant commodity emissions in the SJV NAA in 2021.  
 Changes and percent changes are from previous year.

Commodity	Emissions (tpd)	Percent of Total Emissions	Percent of Fumigant Emissions	Change (tpd)	Percent Change
ALMOND	1.058	8%	34%	-0.255	-19%
CARROTS, GENERAL	0.539	4%	17%	-0.255	-32%
SOIL APPLICATION, PREPLANT-OUTDOOR (SEEDBEDS,ETC.)	0.286	2%	9%	-0.250	-47%
NURSERY-OUTDOOR CONTAINER/FIELD GROWN PLANTS	0.223	2%	7%	0.028	14%
NURSERY-OUTDOOR GROWN TRANSPALNT/PROPAGATIVE MATERIAL	0.161	1%	5%	0.065	67%
GRAPES, WINE	0.088	<1%	3%	0.069	381%
ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	0.070	<1%	2%	0.040	132%
COMMODITY FUMIGATION	0.067	<1%	2%	<0.001	<1%
GRAPES	0.052	<1%	2%	-0.084	-62%
PEACH	0.042	<1%	1%	0.014	52%

There were 210 commodities treated by nonfumigant products, substantially more than by fumigants; however, the top 10 commodities accounted for similar values: 82% of nonfumigant emissions and 85% of the change in nonfumigant emissions (Table 9).

**Table 9:** Top 10 nonfumigant commodity emissions in the SJV NAA in 2021.  
 Changes and percent changes are from previous year.

Commodity	Emissions (tpd)	Percent of Total Emissions	Percent of Nonfumigant Emissions	Change (tpd)	Percent Change
ALMOND	3.511	27%	35%	-0.430	-11%
PISTACHIO (PISTACHE NUT)	1.286	10%	13%	-0.066	-5%
COTTON, GENERAL	0.728	6%	7%	-0.355	-33%
ORANGE (ALL OR UNSPEC)	0.525	4%	5%	0.012	2%
WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	0.449	3%	5%	-0.056	-11%
CORN (FORAGE - FODDER)	0.447	3%	5%	-0.006	-1%
GRAPES	0.367	3%	4%	-0.017	-4%
GRAPES, WINE	0.289	2%	3%	-0.023	-7%
TOMATOES, FOR PROCESSING/CANNING	0.262	2%	3%	-0.045	-15%
TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	0.232	2%	2%	0.005	2%

## HIGH-VOC NONFUMIGANT PRODUCTS

Restrictions are triggered if emissions in an NAA exceed its trigger level (95% of the SIP goal), per Title 3 California Code of Regulations (3 CCR) section 6452.2(f). In the SJV NAA, when restrictions are active and aside from listed exceptions, high-VOC nonfumigant products cannot be applied on any of seven crops between May 1 and October 31 (3 CCR section 6884). High-VOC products are those with a primary AI that is one of abamectin, chlorpyrifos, gibberellins, or oxyfluorfen and is present in a quantity greater than an AI-specific threshold that is listed in 3 CCR section 6880. Products containing one of these primary AIs at or below the listed threshold are LOW-VOC products.

Emissions in 2013 exceeded the SIP goal (18.1 tpd) by 1.420 tpd. Emissions in 2014 decreased below the trigger level (17.2 tpd) to 16.815 tpd. In 2014 emissions from the four AIs accounted for 25% (4.209 tpd) of emissions, and high-VOC product emissions accounted for 20% (3.403 tpd). When restrictions on high-VOC nonfumigant products became effective in 2015, emissions decreased to 16.815 tpd, and the share of emissions for these AIs and high-VOC products respectively declined to 13% (2.027 tpd) and 5% (0.759 tpd). Emissions in 2021 were 13.049 tpd, these AIs accounted for 8% of emissions (1.052 tpd), and high-VOC products for 3% (0.388 tpd). The majority of emissions from these AIs has consisted of low-VOC products since 2015 (Tables 2, 10, 11).

**Table 10:** Emissions from applications of products containing the AIs abamectin, chlorpyrifos, gibberellins, and oxyfluorfen in the SJV NAA.

Changes and percent changes are from previous year.

Year	Emissions (tpd)	Percent of Total Emissions	Percent of Nonfumigant Emissions	Change (tpd)	Percent Change
2021	1.052	8%	11%	-0.212	-17%
2020	1.264	8%	11%	-0.121	-9%
2019	1.385	8%	12%	-0.659	-32%
2018	2.045	13%	17%	-0.289	-12%
2017	2.334	14%	18%	0.294	14%
2016	2.040	13%	18%	0.013	<1%
2015	2.027	13%	19%	-2.182	-52%
2014	4.209	25%	33%		

**Table 11:** Emissions from applications of products containing the AIs abamectin, chlorpyrifos, gibberellins, and oxyfluorfen in the SJV NAA, categorized as high-VOC or low-VOC. Changes and percent changes are from previous year.

Year	Category	Emissions (tpd)	Percent of Total Emissions	Percent of Nonfumigant Emissions	Percent of Four AIs' Emissions	Change (tpd)	Percent Change
2021	Low-VOC	0.665	5%	7%	63%	-0.146	-18%
2021	High-VOC	0.388	3%	4%	37%	-0.066	-15%
2020	Low-VOC	0.811	5%	7%	64%	-0.074	-8%
2020	High-VOC	0.453	3%	4%	36%	-0.047	-9%
2019	Low-VOC	0.885	5%	7%	64%	-0.449	-34%
2019	High-VOC	0.500	3%	4%	36%	-0.210	-30%
2018	Low-VOC	1.334	8%	11%	65%	-0.355	-21%
2018	High-VOC	0.710	4%	6%	35%	0.066	10%
2017	Low-VOC	1.689	10%	13%	72%	0.258	18%
2017	High-VOC	0.645	4%	5%	28%	0.036	6%
2016	Low-VOC	1.432	9%	13%	70%	0.163	13%
2016	High-VOC	0.608	4%	5%	30%	-0.150	-20%
2015	Low-VOC	1.268	8%	12%	63%	0.462	57%
2015	High-VOC	0.759	5%	7%	37%	-2.644	-78%
2014	High-VOC	3.403	20%	27%	81%		
2014	Low-VOC	0.807	5%	6%	19%		

Abamectin and oxyfluorfen were among the top 10 nonfumigant AIs. Abamectin had the largest share of emissions with 5% (0.594 tpd). In 2019 chlorpyrifos emissions declined by more than 99% (-0.516 tpd), in anticipation of CDPR announcing the AI's cancellation in October 2019. Virtually all agricultural use of chlorpyrifos in California ended by December 31, 2020.<sup>1</sup> In 2021 chlorpyrifos emissions remained less than 1% (-0.516 tpd) of 2018 chlorpyrifos emissions (Table 12).

**Table 12:** Emissions from applications of products containing the AIs abamectin, chlorpyrifos, gibberellins, and oxyfluorfen in the SJV NAA, categorized by primary AI. Changes and percent changes are from previous year.

Year	Primary AI	Emissions (tpd)	Percent of Total Emissions	Percent of Nonfumigant Emissions	Percent of Four AIs' Emissions	Change (tpd)	Percent Change
2021	ABAMECTIN	0.594	5%	6%	56%	-0.138	-19%
2021	OXYFLUORFEN	0.402	3%	4%	38%	-0.060	-13%
2021	GIBBERELLINS	0.055	<1%	<1%	5%	-0.009	-15%
2021	CHLORPYRIFOS	0.002	<1%	<1%	<1%	-0.004	-67%
2018	ABAMECTIN	1.042	6%	9%	51%	0.037	4%
2018	CHLORPYRIFOS	0.518	3%	4%	25%	-0.335	-39%
2018	OXYFLUORFEN	0.418	3%	3%	20%	0.010	2%
2018	GIBBERELLINS	0.067	<1%	<1%	3%	>-0.001	>-1%
2014	ABAMECTIN	1.498	9%	12%	36%		
2014	CHLORPYRIFOS	1.404	8%	11%	33%		
2014	OXYFLUORFEN	0.765	5%	6%	18%		
2014	GIBBERELLINS	0.542	3%	4%	13%		

<sup>1</sup> <https://www.cdpr.ca.gov/docs/chlorpyrifos/index.htm>

Since 2014 between 88% and 91% of emissions from these four AIs are attributable to the seven crops listed in 3 CCR section 6884: alfalfa, almonds, citrus, cotton, grapes, pistachios, and walnuts (Table 13). In 2014, emissions from high-VOC products applied to the seven crops accounted for 73% of emissions from these four AIs. In 2021 this had fallen to 33% of these AIs' emissions (Table 14).

**Table 13:** Emissions from applications of products containing the AIs abamectin, chlorpyrifos, gibberellins, and oxyfluorfen in the SJV NAA, categorized by crop.  
 Changes and percent changes are from previous year.

Year	Commodity	Emissions (tpd)	Percent of Total Emissions	Percent of Nonfumigant Emissions	Percent of Four AIs' Emissions	Change (tpd)	Percent Change
2021	SEVEN CROPS	0.943	7%	9%	90%	-0.191	-171%
2021	REMAINING CROPS	0.109	<1%	1%	10%	-0.021	232%
2014	SEVEN CROPS	3.835	23%	30%	91%		
2014	REMAINING CROPS	0.374	2%	3%	9%		

**Table 14:** Emissions from applications of products containing the AIs abamectin, chlorpyrifos, gibberellins, and oxyfluorfen in the SJV NAA, categorized as high-VOC or low-VOC and by crop.

Changes and percent changes are from previous year.

Year	Commodity	Category	Emissions (tpd)	Percent of Total Emissions	Percent of Nonfumigant Emissions	Percent of Four AIs' Emissions	Change (tpd)	Percent Change
2021	SEVEN CROPS	Low-VOC	0.598	5%	6%	57%	-0.126	
2021	SEVEN CROPS	High-VOC	0.345	3%	3%	33%	-0.066	
2021	REMAINING CROPS	Low-VOC	0.067	<1%	<1%	6%	-0.020	64%
2021	REMAINING CROPS	High-VOC	0.042	<1%	<1%	4%	>-0.001	167%
2014	SEVEN CROPS	High-VOC	3.093	18%	24%	73%		
2014	SEVEN CROPS	Low-VOC	0.742	4%	6%	18%		
2014	REMAINING CROPS	High-VOC	0.309	2%	2%	7%		
2014	REMAINING CROPS	Low-VOC	0.065	<1%	<1%	2%		

In 2021 applications of high-VOC products on the seven crops listed in 3 CCR section 6884 accounted for 3% of total emissions (Table 10). Certain applications are exempted from active restrictions. They include but are not limited to, the use of high-VOC oxyfluorfen products at a rate of 0.125 pounds per acre or less, and the use of high-VOC chlorpyrifos products to control aphids on cotton. This is one explanation for the continued use of these products during the ozone period.



## HYPOTHETICAL VOC EMISSIONS

If emissions exceed the trigger level for the SJV NAA, high-VOC product restrictions are active until at least two consecutive years of hypothetical emissions are less than the trigger level (3 CCR section 6884). Restrictions went into effect in 2015, and because this condition has not yet been met the inventory reports continue to calculate hypothetical emissions, to determine whether nonfumigant restrictions can be lifted for upcoming years. This report calculates a preliminary estimate of hypothetical emissions, which will be recalculated and finalized in the subsequent annual report.

Hypothetical emissions are calculated for each combination of AI and crop specified in 3 CCR section 6884 to determine whether they are less than the trigger level. This calculation assumes that the relative mixture of high-VOC and low-VOC products is the same in 2021 as in 2014 (the most recent year without restrictions). The following formula is used to calculate the hypothetical VOC emissions described above for each pesticide-crop combination:

Hypothetical emissions for a pesticide-crop combination listed in section 6884 during May-Oct for the year of restrictions (Table 11 column D)	Emissions for the pesticide-crop combination during May-Oct for the most current year without restrictions (Table 11 column A)	X	Pounds AI for the crop during May-Oct for the year of restrictions (Table 11 column C)
	<hr/>		

Total hypothetical emissions equal the sum of hypothetical emissions for each AI-crop combination and actual emissions for the remaining combinations not listed in 3 CCR section 6884. This can be calculated as total emissions (13.049 tpd), plus the sum of hypothetical emissions for each listed combination (2.277 tpd), minus actual emissions for each listed combination (0.943 tpd):

$$\text{Total hypothetical emissions} = 13.049 + 2.277 - 0.943 = 14.383 \text{ tpd}$$

The 2019 annual report extended these restrictions through the end of 2022. The 2020 annual report's estimate of hypothetical emissions was 16.587 tpd, which is lower than the trigger level (17.2 tpd). The 2021 preliminary estimate of hypothetical emissions is also lower than the trigger level. DPR's 2021 annual report must make a final estimate of 2021 hypothetical emissions before determining whether to lift these restrictions for May 1 - October 31, 2023.

**Table 15:** Calculation of hypothetical emissions in the SJV NAA, as described in Title 3, California Code Of Regulations, section 6884(c):  $D = A / B * C$ .

Primary AI	Commodity	2014 Emissions (tpd) (A)	2014 Applied AI Mass (tpd) (B)	2021 Applied AI Mass (tpd) (C)	2021 Hypothetical Emissions (tpd) (D)	2021 Actual Emissions (tpd)	Difference between 2021 Hypothetical and Actual (tpd)
ABAMECTIN	ALMOND	0.687	0.028	0.037	0.913	0.369	0.544
OXYFLUORFEN	ALMOND	0.469	0.219	0.158	0.338	0.259	0.080
ABAMECTIN	GRAPES	0.325	0.013	0.007	0.182	0.050	0.132
ABAMECTIN	COTTON	0.109	0.004	0.004	0.096	0.040	0.056
OXYFLUORFEN	PISTACHIO	0.063	0.049	0.039	0.050	0.038	0.012
OXYFLUORFEN	WALNUT	0.065	0.031	0.022	0.047	0.037	0.010
ABAMECTIN	WALNUT	0.108	0.005	0.005	0.116	0.037	0.079
ABAMECTIN	CITRUS	0.074	0.003	0.005	0.110	0.037	0.073
GIBBERELLINS	CITRUS	0.255	0.017	0.015	0.229	0.034	0.195
OXYFLUORFEN	GRAPES	0.072	0.028	0.013	0.033	0.018	0.016
GIBBERELLINS	GRAPES	0.250	0.024	0.014	0.150	0.017	0.133
OXYFLUORFEN	COTTON	0.014	0.013	0.001	0.001	0.003	-0.002
OXYFLUORFEN	CITRUS	0.002	<0.001	0.001	0.003	0.002	<0.001
CHLORPYRIFOS	COTTON	0.255	0.260	0.004	0.004	0.002	0.002
ABAMECTIN	PISTACHIO	0.002	<0.001	<0.001	0.004	0.001	0.003
ABAMECTIN	ALFALFA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
GIBBERELLINS	ALMOND	0.000	0.000	<0.001	0.000	<0.001	>-0.001
CHLORPYRIFOS	ALMOND	0.403	0.497	<0.001	<0.001	<0.001	<0.001
GIBBERELLINS	PISTACHIO	0.000	0.000	<0.001	0.000	<0.001	>-0.001
CHLORPYRIFOS	ALFALFA	0.138	0.161	0.000	0.000	0.000	0.000
CHLORPYRIFOS	CITRUS	0.408	0.472	0.000	0.000	0.000	0.000
CHLORPYRIFOS	GRAPES	0.025	0.055	0.000	0.000	0.000	0.000
CHLORPYRIFOS	WALNUT	0.113	0.179	0.000	0.000	0.000	0.000
OXYFLUORFEN	ALFALFA	<0.001	<0.001	0.000	0.000	0.000	0.000
COMBINED	COMBINED	3.835	2.059	0.326	2.277	0.943	1.333

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