INTRODUCTION

Background

In February 2011, as part of DPR's mandate for "continuous evaluation" of currently registered pesticides, the California Department of Pesticide Regulation (DPR) implemented its first multi-year statewide Air Monitoring Network (AMN) for measuring pesticides in various agricultural communities. AMN data is used to estimate subchronic and chronic pesticide exposures. The goals of the AMN are to provide data that assists in assessing potential health risks, developing measures to mitigate risks, and measuring the effectiveness of regulatory requirements.

The AMN consists of the following scientific objectives:

- Identify pesticides in air and determine seasonal, annual, and multiple-year concentrations.
- Compare concentrations to subchronic and chronic health screening levels.
- Track trends in air concentrations over time.
- Estimate cumulative exposure to multiple pesticides with common physiological modes of action in humans (e.g., cholinesterase inhibitors).
- Attempt to correlate concentrations with use and weather patterns.

As part of the community selection process for the AMN, DPR evaluated a total of 1,267 communities and ranked them based on pesticide use (both local and regional), demographic data[2], and availability of other exposure and health data. DPR ranked all 1,267 communities and a total of eight communities were selected for the AMN. In 2017, four sampling sites were operational; four others were added to the AMN in 2018.

At each sampling site location, one 24-hour (h) air sample set was collected on a weekly basis. The air samples were analyzed for 31 pesticides and 5 pesticide breakdown products. This report is the eighth volume of this study and contains AMN results from January 1, 2018, to December 31, 2018.

Changes to the Air Monitoring Network in 2017

The Budget Act of 2016 temporarily increased funding of the AMN, enabling DPR to expand from three original sampling sites to a total of eight sites for a period of two years (Vidrio, et al., 2017). During the temporary expansion of the AMN, DPR is responsible for operation of three sites while the California Air Resources Board (ARB) is responsible for operating five sampling sites. Due to sampling equipment and site procurement delays, the site expansion took place in various phases starting on January 1, 2017, and concluding in August 2018 when the last of the eight monitoring sites was added to the AMN.

Number of Communities Monitored

Four communities were selected based on nearby use of the fumigants 1,3-dichloropropene (1,3-D), chloropicrin, methyl isothiocyanate (MITC), and MITC-generators, while the other four communities were selected based on the use of selected organophosphates (Vidrio et al., 2017). However, all eight sites were monitored for all 36 compounds. Complete details on community selection can be found at:

[2] Communities with similar pesticide-use rankings were prioritized based on the number of children, number of persons over 65, and number of persons living in close proximity to farms and agricultural areas with high pesticide use.

https://www.cdpr.ca.gov/docs/emon/airinit/community_monitoring.htm. Table 1 lists the eight communities selected for monitoring.

Table 1. List of communities in the 2017 AMN monitoring plan.

Community	County	Date of first sample collection	Agency Responsible for Site Operation
Chualar	Monterey	1/1/2017	DPR
Cuyama	Santa Barbara	5/10/2018	ARB
Lindsay	Tulare	4/26/2018	ARB
Oxnard	Ventura	8/14/2018 ‡	ARB
San Joaquin	Fresno	4/26/2018	ARB
Santa Maria	Santa Barbara	1/1/2017	DPR
Shafter	Kern	1/1/2017 | 4/2/2018 *	DPR → ARB*
Watsonville	Monterey	1/1/2017	DPR

* Monitoring responsibilities of site was transitioned from DPR to ARB. Samples collected by ARB staff began to be processed as primary samples on 4/2/18.

‡ The Oxnard sampling site transitioned from a Toxic Air Contaminant (TAC) monitoring site to an AMN site in 2018. Additional information on TAC monitoring including annual monitoring reports can be accessed at the following site: https://www.cdpr.ca.gov/docs/emon/airinit/air_monitoring_reports.htm

ARB began monitoring at their five assigned sites on various dates throughout 2018. The dates at which monitoring began at each of those sites are detailed in Table 1. Monitoring at Shafter was performed by DPR staff until ARB was able to take over the monitoring at the site. Additionally, Oxnard began the year as a Toxic Air Contaminant (TAC) network site in which 1,3-D and methyl bromide were monitored using 6-day intervals until it was transitioned to a full AMN site in August. After the transition, weekly monitoring for all 36 compounds was conducted at the Oxnard AMN site.

Equipment Upgrades

The increase in temporary funding allowed for DPR and ARB to purchase upgraded sampling equipment custom built for pesticide ambient air monitoring. A key advantage of the new system is greater accuracy and precision in sample collection.

Pesticides Monitored

As part of the AMN, DPR monitored for 31 pesticides and 5 breakdown products. Chemicals included in the AMN were selected based primarily on potential health risk (Vidrio et al., 2013a). Four analytical methods were used to analyze the collected air samples as part of the AMN[3]:

(1) Multi-pesticide Residue;
(2) Volatile Organic Compounds (VOC);
(3) Methyl Isothiocyanate (MITC); and
(4) Chloropicrin.

[3] Greater detail on each of these analytical methods is provided in Appendices I and J.

AIR MONITORING NETWORK RESULTS

Results for all Pesticides and Communities Combined[4]

Pesticide Detections

A total of 12,058 analyses were conducted on the air samples collected from the 8 AMN sites operating from January 1, 2018, to December 31, 2018. Of the 12,058 analyses 6.2% (742) resulted in a detectable concentration, which includes both quantifiable and trace detections[5]. Samples that resulted in a quantifiable detection accounted for 1.3% (152) of all analyses conducted.

Of the 36 pesticides and breakdown products monitored; 11 were detected at quantifiable levels, 17 were detected at trace levels, and 8 were not detected. Table 2 lists the number of detections by type for each pesticide and pesticide breakdown product at all sites included in the AMN for this year. The chemicals with the highest number of quantifiable detections were MITC (21.7%), 1,3-D (11.1%), and chloropicrin (3.6%).

Table 2. Number and percentage of positive samples per chemical for all AMN sites during 2018.

Chemical	Number of possible detections	Total number of detections*	Number of quantified detections	Percent of possible detections	Percent of quantifiable detections
1,3-dichloropropene	333	37	37	11.1%	11.1%
Acephate	335	5	0	1.5%	0%
Bensulide	335	3	0	0.9%	0%
Chloropicrin	336	34	12	10.1%	3.6%
Chlorothalonil	335	96	5	28.7%	1.5%
Chlorpyrifos	335	31	2	9.3%	0.6%
Chlorpyrifos OA	335	35	2	10.4%	0.6%
Chlorthal-dimethyl	335	84	6	25.1%	1.8%
Cypermethrin	335	1	0	0.3%	0%
DDVP	335	32	0	9.6%	0%
DEF	335	0	0	0%	0%
Diazinon	335	0	0	0%	0%
Diazinon OA	335	2	0	0.6%	0%
Dimethoate	335	1	0	0.3%	0%
Dimethoate OA	335	5	1	1.5%	0.3%
Diuron	335	6	0	1.8%	0%
Endosulfan	335	3	0	0.9%	0%
Endosulfan Sulfate	335	0	0	0%	0%
EPTC	335	3	0	0.9%	0%
Iprodione	335	3	0	0.9%	0%

[4] See Appendices A-H for detailed Air Monitoring Network Results for each sampling location.

[5] Quantifiable detections refer to concentrations above the Limit of Quantitation (LOQ) for the respective pesticide.

Trace detections are measured concentrations between the LOQ and the Method Detection Limit (MDL).

Non-detections refer to all samples with measured concentrations below the MDL.

Malathion	335	40	2	11.9%	0.6%
Malathion OA	335	48	0	14.3%	0%
Methidathion	335	0	0	0%	0%
Methyl bromide	333	10	10	3.0%	3.0%
Metolachlor	335	1	0	0.3%	0%
MITC	336	207	73	61.6%	21.7%
Norflurazon	335	0	0	0%	0%
Oryzalin	335	1	0	0.3%	0%
Oxydemeton methyl	335	0	0	0.0%	0%
Oxyfluorfen	335	6	0	1.8%	0%
Permethrin	335	2	0	0.6%	0%
Phosmet	335	0	0	0%	0%
pp-Dicofol	335	0	0	0%	0%
Propargite	335	5	0	1.5%	0%
Simazine	335	5	0	1.5%	0%
Trifluralin	335	36	2	10.7%	0.6%
Total	**12,058**	**742**	**152**	**6.2%**	**1.3%**

* Includes both quantified and trace detections.

Table 3 summarizes the total number of detections of the monitored chemicals by community. The percentages of detections for monitored chemicals in each community ranged from 2.9% to 8.4% of all collected samples. These detections included quantifiable detections (above the Limit of Quantitation (LOQ)) and trace detections (above the Method Detection Limit (MDL) but below the LOQ). Shafter had the highest percentage of samples with detections (8.4%), as well as the highest percentage of samples with quantifiable detections (3.0%).

A sample set is the collective term for all samples recovered from one site in one week (each sample set includes four chemical analyses methods). A total of 336 sample sets were taken from all eight (8) communities (53 sets from Shafter; 52 sets each from Santa Maria, Watsonville, and Chualar; 36 sets each from Lindsay and San Joaquin; 35 sets from Cuyama, and 20 sets from Oxnard). Two hundred eighty-eight (86%) of these sample sets contained at least one detection (Table 4).

There were a total of four lost samples in 2018. Three of these were summa canisters, used to sample for the VOCs 1,3-D and methyl bromide; they arrived at the Air Resources Board – Organic Laboratory Section (ARB-OLS) lab with pressure that was outside the acceptable range for analysis. This was most likely due a mechanical valve failure or leak during storage or transit. The sorbent media from one multi-residue cartridge was lost during analysis by the California Department of Food and Agriculture (CDFA) laboratory, thereby making this sample invalid.

Table 3. Detections of monitored chemicals by location, as individual samples during 2018.

Community	Number of possible detections	Total number of detections*	Number of quantifiable detections	Percent of possible detections	Percent of quantifiable detections
Shafter	1,908	161	58	8.4%	3.0%
Santa Maria	1,840	151	16	8.2%	0.9%

Watsonville	1,870	54	13	2.9%	0.7%
Chualar	1,870	114	23	6.1%	1.2%
Oxnard	720	42	6	5.8%	0.8%
Cuyama	1,260	48	10	3.8%	0.8%
Lindsay	1,294	68	7	5.3%	0.5%
San Joaquin	1,296	104	19	8.0%	1.5%
Total	**12,058**	**742**	**152**	**6.2%**	**1.3%**

* Includes both quantifiable and trace detections.

Table 4. Detections of monitored chemicals by location, as weekly sample sets during 2018.

Community	Number of sample sets	Number of sets with at least one detection *	Percent of sample sets with at least one detection
Shafter	53	51	96%
Santa Maria	52	45	87%
Watsonville	52	29	56%
Chualar	52	51	98%
Oxnard	20	18	90%
Cuyama	35	33	94%
Lindsay	36	28	78%
San Joaquin	36	33	92%
Total	**336**	**288**	**86%**

* Includes both quantifiable and trace detections.

Pesticide Concentrations

Acute Exposure: Highest 24-hour Concentrations Among All Sites

While the results of the 24-h samples and acute exposures are discussed in this report, estimating acute exposures is not one of the AMN objectives as the AMN is designed to best measure subchronic and chronic exposures. DPR and ARB routinely conduct application-site monitoring studies that are designed to assess acute exposures to pesticides as monitoring is conducted in the immediate vicinity (100 feet or less) of a treated field. Application site monitoring studies for individual pesticides and all monitoring reports can be found at:

https://www.cdpr.ca.gov/docs/emon/airinit/air_monitoring_reports.htm.

Table 5 lists the highest 24-h concentrations at any site for the pesticides detected at a quantifiable concentration in 2018. None of the pesticides or breakdown products exceeded their respective acute (24-h or 72-h) screening levels or regulatory targets during 2018 monitoring. Of all monitored pesticides, the pesticide with the highest percentage of 24-h air concentration compared to its acute screening level (45.3%) was 1,3-D, followed chlorpyrifos (4.2%), chlorpyrifos OA (1.2%), and chloropicrin (1.1%). All other compounds were less than 1% of their acute screening level or regulatory target during monitoring in 2018 (Table 5). The following chemicals were only detected at trace levels at any monitoring location:

- Acephate
- Bensulide
- Cypermethrin

- DDVP
- Diazinon OA
- Dimethoate
- Diuron
- Endosulfan
- EPTC
- Iprodione
- Malathion OA
- Metolachlor
- Oryzalin
- Oxyfluorfen
- Permethrin
- Propargite
- Simazine

The following chemicals were not detected at any monitoring location:

- DEF
- Diazinon
- Endosulfan sulfate
- Methidathion
- Norflurazon
- Oxydemeton methyl
- Phosmet
- pp-dicofol

Table 5. Highest 24-h air concentrations, acute screening levels, and percent of screening level of any pesticide detected at a quantifiable concentration in 2018 among all eight sites.

Chemical	Highest 24-h concentration	24-h acute screening level	% of screening level
1,3-dichloropropene	50.5 ppb (228,936 ng/m³)	110 ppb (505,000 ng/m³)	45.3%
Chloropicrin	0.8 ppb (5,367 ng/m³)	73.0 ppb (491,000 ng/m³) **	1.1%
Chlorothalonil	0.005 ppb (50 ng/m³)	3 ppb (34,000 ng/m³)	0.1%
Chlorpyrifos	0.004 ppb (50 ng/m³)	0.1 ppb (1,200 ng/m³) ***	4.2%
Chlorpyrifos OA	0.001 ppb (14 ng/m³)	0.1 ppb (1,200 ng/m³) ***	1.2%
Chlorthal-dimethyl	0.003 ppb (39 ng/m³)	1,700 ppb (23,500,000 ng/m³)	0.00%
Dimethoate OA	0.002 ppb (17 ng/m³)	0.5 ppb (4,300 ng/m³)	0.4%

Malathion	0.0007 ppb (9.8 ng/m³)	8.5 ppb (113,000 ng/m³)	0.01%
Methyl bromide	0.097 ppb (376 ng/m³)	210 ppb (820,000 ng/m³) *	0.05%
MITC	1.2 ppb (3,726 ng/m³)	220 ppb (660,000 ng/m³) *	0.56%
Trifluralin	0.03 ppb (405 ng/m³)	90 ppb (1,200,000 ng/m³)	0.03%

* This value is a regulatory target rather than a screening level.
** This value is an 8-h time-weighted-average (TWA) used to compare against the 24-h measured concentration.
*** DPR's May 28, 2019, risk management directive for chlorpyrifos established an acute regulatory target of 0.28 ppb (4,050 ng/m³), 1-hr TWA. However, the current sample duration does not allow for a direct comparison between the acute regulatory target concentration and the measured sample values.

Subchronic Exposure: Highest Rolling 4-Week or 13-Week Average Concentrations Among All Sites

Table 6 lists the highest observed rolling 4-week or 13-week average concentrations for any chemical detected at a quantifiable concentration in 2018 among all sites. 1,3-D was the pesticide with the highest rolling 13-week average concentration with an estimated concentration of 5.6 ppb. This concentration was determined to be 182% of the subchronic screening level. This exceedance was primarily driven by one abnormally high 24-h concentration detected at Shafter on 1/22/18. After a DPR investigation, it was determined that the probable cause that led to this detection was a result of a 25 acre 1,3-D application that took place about 0.15 miles upwind of the monitoring site location. No other pesticides or breakdown products were observed to exceed their respective subchronic screening levels or regulatory targets. Among those, the highest percentage of screening level reached was that of MITC (50.1%), followed by chloropicrin (32.5%), then chlorpyrifos (2.5%).

Table 6. Highest rolling 4-week average air concentrations, subchronic screening levels, and percent of screening level of any pesticide detected at a quantifiable concentration in 2018 among all eight sites.

Chemical	Highest rolling 4-week average concentration†	Subchronic screening level	% of screening level
1,3-dichloropropene	5.6 ppb (25,422 ng/m³)	3.0 ppb (14,000 ng/m³)	182%
Chloropicrin	0.11 ppb (748 ng/m³)	0.35 ppb (2,300 ng/m³)	32.5%
Chlorothalonil	0.003 ppb (35 ng/m³)	3 ppb (34,000 ng/m³)	0.1%
Chlorpyrifos	0.002 ppb (22 ng/m³)	0.06 ppb (850 ng/m³)	2.5%
Chlorpyrifos OA	0.0005 ppb (7.3 ng/m³)	0.06 ppb (850 ng/m³)	0.9%
Chlorthal-dimethyl	0.002 ppb (25 ng/m³)	35 ppb (470,000 ng/m³)	0.01%
Dimethoate OA	0.0008 ppb	0.3 ppb	0.2%

	(6.9 ng/m³)	(3,000 ng/m³)	
Malathion	0.0005 ppb (6.4 ng/m³)	6 ppb (80,600 ng/m³)	0.01%
Methyl bromide	0.04 ppb (155 ng/m³)	5.0 ppb (19,400 ng/m³) *	0.8%
MITC	0.5 ppb (1,502 ng/m³)	1.00 ppb (3,000 ng/m³)	50.1%
Trifluralin	0.012 ppb (167 ng/m³)	12 ppb (170,000 ng/m³)	0.1%

† Concentrations are presented as rolling or moving averages (i.e., average of weeks 1, 2, 3, and 4; average of weeks 2, 3, 4, and 5; etc.).

* This value is a regulatory target rather than a screening level.

** These concentrations represent the highest 13-week rolling average, rather than the default 4-week rolling average.

Chronic Exposure: Highest One Year Average Concentrations Among All Sites

Table 7 presents the highest observed annual average concentrations for each chemical detected at a quantifiable concentration in 2018 at any AMN site with one full year of monitoring data available alongside its respective chronic screening levels. The highest annual average concentration relative to its chronic screening level was that of 1,3-D (76.9%), followed by MITC (58.3%), then chloropicrin (15.4%).

Table 7. Highest annual average air concentrations, chronic screening levels, and percent of screening level of any pesticide detected at a quantifiable concentration in 2018 among all eight sites.

Chemical	Highest annual average concentration	Chronic screening level	% of screening level
1,3-dichloropropene	1.5 ppb (6,920 ng/m³)	2.00 ppb (9,000 ng/m³)	76.9%
Chloropicrin	0.041 ppb (277 ng/m³)	0.27 ppb (1,800 ng/m³)	15.4%
Chlorothalonil	0.0009 ppb (10 ng/m³)	3 ppb (34,000 ng/m³)	0.03%
Chlorpyrifos	0.0004 ppb (5.3 ng/m³)	0.04 ppb (510 ng/m³)	1.0%
Chlorthal-dimethyl	0.0005 ppb (7.1 ng/m³)	3.5 ppb (47,000 ng/m³)	0.02%
Malathion	0.0003 ppb (3.5 ng/m³)	0.6 ppb (8,100 ng/m³)	0.04%
Methyl bromide	0.018 ppb (71 ng/m³)	1.00 ppb (3,900 ng/m³)	1.8%
MITC	0.058 ppb (175 ng/m³)	0.10 ppb (300 ng/m³)	58.3%

Lifetime Exposure: Cancer Risk Estimates

The AMN monitors for seven pesticides that have been designated as potential carcinogens by Proposition 65 or by U.S. EPA's B2 list: 1,3-D, chlorothalonil, DDVP, diuron, iprodione, oxydemeton methyl, and propargite. Of these, only 1,3-D and chlorothalonil had any quantifiable concentrations during 2018 AMN sampling. Annual average concentrations and cancer risk estimates for 1,3-D and chlorothalonil are shown in Table 8 and Table 9. These calculations use the average concentration using all data available from the specified site. This data was limited to communities with at least one full year of monitoring as part of the AMN. It is important to note that these shorter timeframes are less suitable for comparison to a 70-year target and are shown for illustrative purposes only. These values differ from those presented in the calculated annual concentrations above because those are a simple mean (average) while a TWA is used for the cancer risk estimates.

Cancer risk is expressed as a probability for the occurrence of cancer (e.g., 1 in 1,000,000 or 10^{-6}, 1 in 100,000 or 10^{-5}, etc.). Risk in the range of 10^{-5} to 10^{-6} or less is generally considered to be at the limit of what is considered to be negligible. Cancer risk is estimated based on the following calculation:

$$Cancer\ Risk = CPFH * LAC * nBR$$

where:

Cancer Risk = probability of an additional case of cancer over a 70-year period.
CPFH = estimated cancer potency factor in humans $(mg/kg/day)^{-1}$.
LAC = mean lifetime (70-year) air concentration $(mg\ m^{-3})$.
nBR = normalized breathing rate of a human adult $(m^3\ kg^{-1}\ day^{-1})$.

DPR assumes nBR to be 0.28 $m^3\ kg^{-1}\ day^{-1}$ (DPR, 2015). Based on the available monitoring data, LAC is taken as the mean annual concentration of the pesticide for all available monitoring years. DPR has estimated the following CPF_H values for three of the seven AMN-monitored pesticides, two of which were detected in 2018:

- For 1,3-D: CPF_H= 0.014 $(mg/kg\text{-}day)^{-1}$ (DPR, 2015).
- For chlorothalonil: CPF_H= 0.016 $(mg/kg\text{-}day)^{-1}$ (DPR, 2018).

Table 8. Average 1,3-dichloropropene concentrations, regulatory target, cancer risk estimates, cancer risk target, and proportion of cancer risk target for each AMN sampling location during 2018.

Community	Average concentration (ng/m^3)	Lifetime regulatory target (ng/m^3)	Cancer risk estimate	Target	Percent of target (%)
Chualar	180	2,600	7.06E-07	1.00E-05	7
Santa Maria	593	2,600	2.32E-06	1.00E-05	23
Shafter	2,115	2,600	8.29E-06	1.00E-05	83
Watsonville	455	2,600	1.78E-06	1.00E-05	18

Table 9. Average chlorothalonil concentrations, cancer risk estimates, cancer risk target, and proportion of cancer risk target for each AMN sampling location during 2018.

Community	Average concentration (ng/m³)	Cancer risk estimate	Target	Percent of target (%)
Chualar	5.53	2.48E-08	1.00E-05	0.25
Santa Maria	4.52	2.03E-08	1.00E-05	0.20
Shafter	14.1	6.33E-08	1.00E-05	0.63
Watsonville	3.87	1.73E-08	1.00E-05	0.17

Cumulative Exposure Estimates for Organophosphates

Cumulative exposures were calculated for organophosphates because these are the only pesticides included in the AMN that have a common mode of action (cholinesterase inhibition) and that were detected at quantifiable concentrations. The 14 organophosphates included in the AMN monitoring are:

- Acephate
- Bensulide
- Chlorpyrifos and its oxygen analog
- DDVP
- DEF
- Diazinon and its oxygen analog
- Dimethoate and its oxygen analog
- Malathion and its oxygen analog
- Oxydemeton methyl
- Phosmet

As described in Appendix K, the cumulative exposure was estimated using a hazard quotient (HQ) and hazard index (HI) approach that relies on the ratio between the detected air concentration and the screening level. The organophosphate cumulative exposures were estimated for each community and exposure period.

Table 10 summarizes the highest calculated HI's for each community and time period during monitoring in 2018. Both the acute and subchronic HI values were calculated for each individual sample set, from which the maximum observed HI was reported. None of the HI's exceeded a value of 1.0 at any of the sampling locations during this year. This indicates that even for the combined 14 organophosphate compounds, a summed screening level was not exceeded.

Table 10. Summary of organophosphate cumulative exposure.

Community	Acute Hazard Index	Subchronic Hazard Index	Chronic Hazard Index
Chualar	0.005	0.010	0.010
Cuyama	0.005	0.007	0.009
Lindsay	0.025	0.024	0.018
Oxnard	0.008	0.007	0.009
San Joaquin	0.025	0.025	0.021
Santa Maria	0.040	0.015	0.013
Shafter	0.053	0.036	0.022
Watsonville	0.005	0.008	0.010

DISCUSSION

Fumigants accounted for four of the eleven pesticides detected at quantifiable concentrations by the AMN in 2018. These fumigants were 1,3-D, chloropicrin, methyl bromide, and MITC. Quantifiable detections of 1,3-D were observed at Chualar, Oxnard, San Joaquin, Santa Maria, and Shafter; quantifiable detections of chloropicrin were observed at Chualar, Oxnard, Santa Maria, and Watsonville; and quantifiable detections of methyl bromide were observed at San Joaquin and Shafter. MITC was quantifiably detected at all currently active AMN sites. Organophosphates and their breakdown products accounted for another four of the eleven pesticides detected at quantifiable concentrations. These were chlorpyrifos and its OA, dimethoate OA, and malathion. The remaining three pesticides detected at quantifiable concentrations in 2018 were chlorothalonil, chlorthal-dimethyl, and trifluralin.

An HI was calculated for the included organophosphates that have a common mode of action (cholinesterase inhibition) and that were detected at quantifiable concentrations. The maximum HI calculated for any site at any exposure period was 0.053, indicating a low risk from cumulative exposure.

Overall, concentrations representing subchronic exposure were higher than acute or chronic exposures relative to their respective screening levels. Acute exposures were generally higher than chronic exposures relative to their respective screening levels. As previously discussed, while acute exposure is discussed in this report, the AMN best measures subchronic and chronic exposures.

The only concentration to exceed its respective screening level was that of 1,3-D in Shafter for the subchronic timeframe. The 13-week average concentration was mainly driven by a single elevated air concentration of 50.5 ppb observed on 1/22/18. This unusual result was immediately investigated by DPR and CDFA-CAC laboratory to validate the detection value. The Kern County Agricultural Commissioner's Office was informed of the preliminary result, compliant with our standard practice. DPR is in the process of developing regulations to reduce exposures to 1,3-D in ambient air.