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MEMORANDUM

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SUBJECT: MONITORING RESULTS FROM A TARPED, HIGH BARRIER FILM, SHALLOW INJECTION METHYL BROMIDE APPLICATION IN SAN LUIS OBISPO COUNTY

Introduction—Methyl bromide is widely used as a preplant soil fumigant for control of nematodes, fungi, diseases, and weeds. The Department of Pesticide Regulation (DPR) and county agricultural commissioners have implemented permit conditions, including buffer zones, to mitigate unacceptable methyl bromide exposure (greater than 0.21 parts-per-million; 24-hour time-weighted average). The buffer zone distances for this method have been determined from data received and evaluated by DPR to date. Additional monitoring was made to test and evaluate the effectiveness of the buffer zone distances.

Materials and Methods—The field monitored was treated with methyl bromide by a shallow broadcast tarped application method on September 2, 1998. In this method the methyl bromide is injected into the soil at a depth of 12 inches and immediately covered with a high density polyethylene (high barrier) tarpaulin with

the application rig. The field was treated in 11-foot wide strips, one edge glued to the preceding strip and the other edge buried in the soil. The field was located in the city of Arroyo Grande in the county of San Luis Obispo.

The application site consisted of a 2.1-acre portion of a 30-acre field. Two other small portions were treated on the same day north of the tested site. Other portions of the field had been treated with methyl bromide/chloropicrin. A 3-acre piece 30 feet to the east was treated on August 27, six days prior. A 5-acre piece 500 feet to the north was treated on August 31 (Figure 1). The field had a slope down towards the north: ~10% for the application site, ~2% for the rest of the field. The buffer zone for this application was 200 feet from the north edge and 100 feet from the other three edges. The application rate was 285 pounds per acre of formulated product, 75 percent methyl bromide 25 percent chloropicrin. Application took approximately 1-1/2 hours.

Ambient air samples were collected at 18 locations using activated charcoal tubes (SKC #226-38-02) and air samplers (SKC #226-38-02) calibrated at 15 milliliters-per-minute. Eighteen samplers were located approximately 30,100 and 30,200 feet from the treatment edge. Samplers 4, 11 and 12 were moved closer to the field and sample locations 17 and 18 were added after the first sampling period. Table 1 and Figure 2 indicate the position of each sampler. Samples were collected for five sampling periods beginning with start of fumigation at 6:20 a.m. Samples were collected for two 6-hour periods followed by three 12-hour periods, for a total of 48 hours.

The California Department of Food and Agriculture's Center for Analytical Chemistry conducted the laboratory analyses. These samples were extracted with ethyl acetate and analyzed using a gas chromatograph with an electron capture detector.

The weather was cloudy/overcast in the mornings and evenings with light rain during sampling periods 2 and 3. Temperatures ranged from 56 to 74 degrees Fahrenheit. The wind was generally from the west-southwest at 3 to 6 miles-per-hour 40 percent of the time, and 0 to 3, and 6 to 10 miles-per-hour for 50, and 10 percent of the time respectively (Figure 2).

Results—Off-site air concentrations did not exceed DPR's target level of 0.21 parts-per-million (24-hour time-weighted-average) at the resident buffer zone distance. Air concentrations ranged from no detectable amount to 0.101 parts-per million (24-hour time-weighted-average). The highest concentrations at the 100 and 200 foot samplers were 0.058 parts-per-million at sampler 9 (105 feet), and 0.016 parst-per-million at sampler 15 (210 feet). The highest concentrations were detected during the third monitoring interval, a 12-hour interval from 6:00 p.m. to 6:00 a.m.

Table 1. Ambient methyl bromide air concentrations.

Sampler		Methyl Bromide (ppm) for each sampling Period					
		Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	24-Hour[1]
Site	Distance	6 Hour	6 Hour	12 Hour	12 Hour	12 Hour	TWA
1	33ft	**0.101**	ND	**0.040**	ND	0.006	0.047[2]
2	35ft	**0.068**	**0.016**	**0.160**	0.041	0.021	0.101
3	30ft	**0.050**	**0.024**	**0.060**	0.028	0.012	0.048
4	31/69ft*	**0.024**	**0.037**	**0.024**	0.020	0.013	0.027
5	34ft	ND	**0.014**	**0.025**	0.010	ND	0.017[2]
6	32ft	ND	ND	**0.024**	ND	0.009	0.015[2]
7	99ft	**0.016**	ND	**0.015**	ND	ND	0.013[2]
8	111ft	**0.027**	ND	**0.100**	0.021	0.008	0.058[2]
9	105ft	**0.020**	ND	**0.033**	0.011	0.006	0.023[2]
10	132ft	**0.013**	**0.010**	**0.011**	0.012	ND	0.011
11	111/135ft*	**0.017**	**0.031**	**0.016**	0.014	0.008	0.020
12	96/132ft*	ND	ND	**0.005**	ND	lost	0.005[2]
13	100ft	ND	ND	**0.007**	ND	0.007	0.006[2]
14	103ft	ND	ND	**0.005**	ND	0.006	0.005[2]
15	210ft	ND	ND	**0.027**	0.008	0.006	0.016[2]
16	204ft	**0.009**	ND	**0.021**	0.008	0.008	0.014[2]
17	30ft	NS	**0.049**	**0.050**	0.038	0.014	0.038
18	30ft	NS	**0.116**	**0.066**	0.055	0.025	0.063

[1] the peak 24-hour time-weighted-average is derived from the concentrations in bold.
[2] indicates that the 24-hour average includes a period of no detectable amount, 0.0025ppm (12-hr sample) or 0.005ppm (6-hr sample) was used to obtain the 24-hour average.
* Sampler was relocated to shorter distance after first sampling period.
ND = No detectable amount; reporting limit = 0.010 ppm for 6-hr samples and 0.005 ppm for 12-hr samples.
lost = Sample lost due to sampler malfunction or laboratory error.
NS = Not sampled during interval 1.

Figure 1. Field diagram, application sites and dates, not to scale.

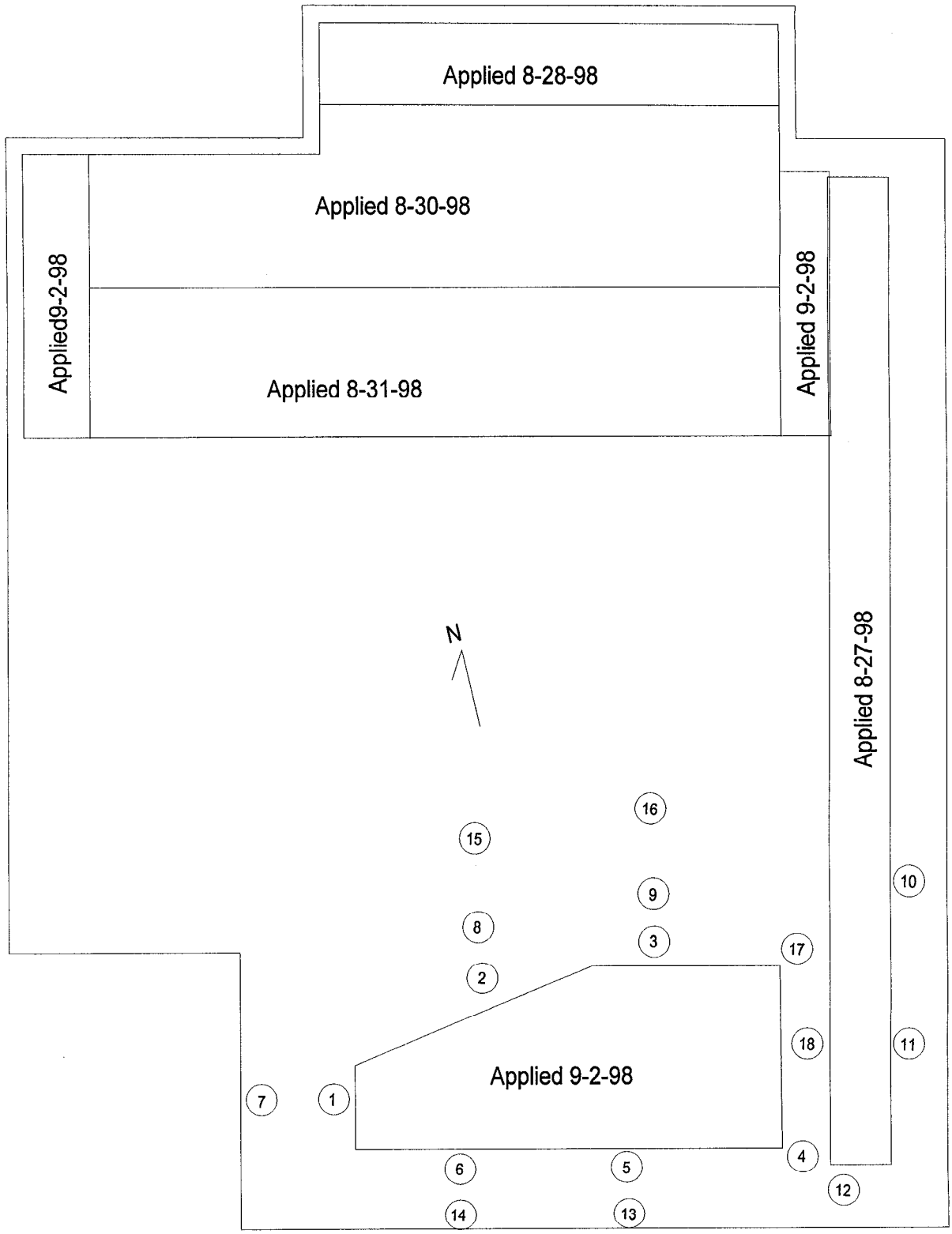
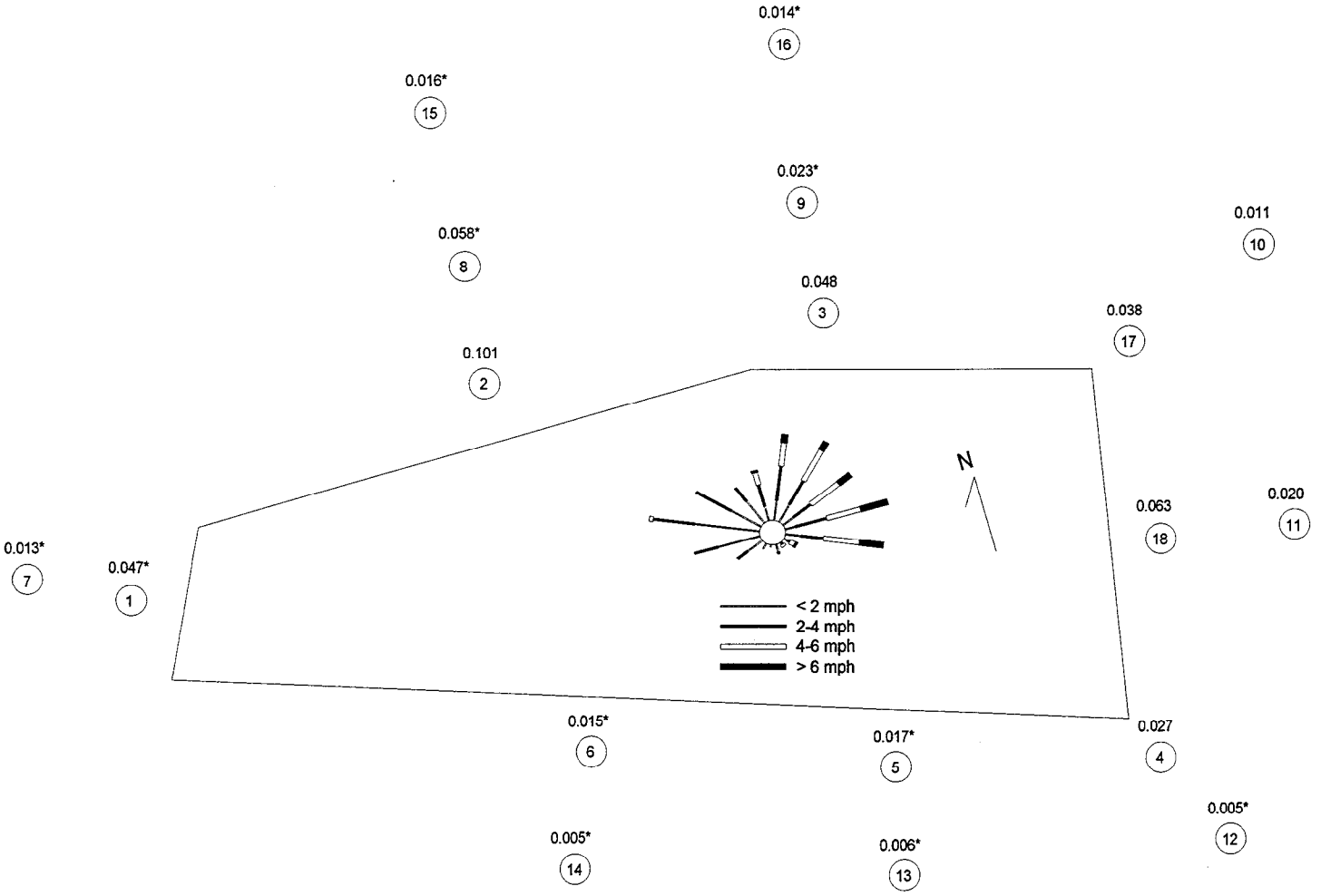


Figure 2. The application site, sampler positions, and the 24-hour time-weighted-average concentration* and wind rose diagram for intervals 1,2 & 3 (parts per million).



* Includes periods of no detectable amount, ½ the detection limit was used to obtain the 24-hour average.

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