

EXECUTIVE SUMMARY
OF
1980 DEF & BUTYL MERCAPTAN
MONITORING STUDY

The Environmental Hazards Assessment Program initiated a DEF-butyl mercaptan monitoring study during the 1980 cotton defoliation season to determine the aerial levels of these materials in Coalinga, Dos Palos, Lemoore and Mendota. The study utilized permanent monitoring sites (HiVol sampler and bubbler) in each of the selected towns and a mobile laboratory with a gas chromatograph calibrated for butyl mercaptan. The air monitors at the permanent sites sampled 12 hour increments continuously during the defoliation period (1 October 1980 to 2 November 1980) and the mobile laboratory maintained a rotating schedule among the four towns sampling instantaneous concentrations every hour.

A total of 19,104 gallons of Folex and 62,996 gallons of DEF was applied in the study area during the 1980 defoliation season. Figure 1 indicates the spacial distribution of the DEF and Folex applications in relationship to the towns where monitoring activities were situated. This application map is a summation for each section over the whole defoliation season and in many cases reflects repeat applications on the same acreage. No aerial applications of the defoliant occurred within a one mile radius of all monitoring locations except Mendota where significant amounts were used in an adjacent section. The amount of defoliant applied within a two mile radius of these towns was insignificant when compared to the total amount applied.

I. DEF

DEF was detected at each of the permanent monitoring sites during the course of the monitoring study (Table 1). Extremely low levels ranging from 0 to 0.034 parts per trillion (ppt), a calculated average for 12 hours, were recorded. Mendota appeared to be impacted by the highest values but it only collected a total of 0.98 μg DEF for the entire study period. This value should not be used as an indication of total human exposure since it was accumulated from an HiVol sampler operating at 17.8 FT³ per minute for the entire monitoring period. Human exposure inferences must be related to the ppt values listed in Table 1.

II. Butyl Mercaptan

A previously untried field sampling method for butyl mercaptan was employed at each of the four sampling locations. This consisted of a bubbler system which utilized a silver salt precipitate to indicate the amount of sulfur trapped. Butyl mercaptan or other sulfur containing compounds provide the sulfur to precipitate the silver salt. Silver precipitate was found in the bubbler systems at all four permanent monitoring locations and it is presumed that much of the total was due to butyl mercaptan, a breakdown product of DEF. Unfortunately, since the method is not butyl mercaptan specific and the incidence of silver precipitate does not correlate well with the instantaneous readings from the mobile laboratory, the silver analyses in Table 1 cannot be interpreted as being indicative totally of butyl mercaptan levels.

TABLE 1

LEVELS OF DEF AND SILVER (AG) COLLECTED DURING STUDY PERIOD

DATE/TIME	LOCATION/CONCENTRATION							
	DOS PALOS		MENDOTA		LEMOOKE		COALINGUA	
	DEF PPT	UC AG	DEF PPT	UC AC	DEF PPT	UC AC	DEF PPT	UC AC
1 OCT 80 PM	0.001	N.D.	0.013	100.	0.018	120.	0.015	140.
2 OCT 80 AM	0.001	100.	0.002	170.	0.002	N.D.	0.000	68.
2 OCT 80 PM	0.002	650.	0.020	130.	N.D.	270.	N.D.	260.
3 OCT 80 AM	0.000	140.	0.006	180.	0.001	340.	0.001	150.
3 OCT 80 PM	0.003	170.	0.024	N.D.	N.D.	230.	0.001	490.
4 OCT 80 AM	N.D.	170.	N.D.	260.	0.002	240.	0.000	260.
4 OCT 80 PM	0.002	190.	0.034	230.	0.013	340.	0.001	N.D.
5 OCT 80 AM	0.001	48.	0.003	240.	0.015	56.	0.000	380.
5 OCT 80 PM	0.001	140.	0.004	72.	0.014	140.	01000	96.
6 OCT 80 AM	0.004	220.	0.004	220.	0.007	160.	0.001	N.D.
6 OCT 80 PM	0.003	620.	0.003	430.	N.D.	240.	N.D.	250.
7 OCT 80 AM	01004	65.	0.003	110.	N.D.	57.	N.D.	32.
7 OCT 80 PM	0.005	77.	0.021	94.	0.014	140.	01000	130.
8 OCT 80 AM	0.002	90.	0.003	30.	0.002	130.	01000	30.
8 OCT 80 PM	0.003	23.	N.D.	160.	0.019	"	N.D.	"
9 OCT 80 AM	0.001	"	0.003	"	0.018	95.	0.001	45.
9 OCT 80 PM	0.003	29.	0.019	42.	0.008	"	0.001	"
10 OCT 80 AM	0.001	"	0.002	"	0.010	25.	0.001	34.
10 OCT 80 PM	0.001	N.D.	0.000	130.	0.012	"	0.001	"
11 OCT 80 AM	0.001	N.D.	0.004	"	0.003	130.	01000	130.
11 OCT 80 PM	0.003	N.D.	0.008	"	0.014	16.	0.002	110.
12 OCT 80 AM	0.001	44.	0.002	28.	0.006	"	0.001	"
12 OCT 80 PM	0.002	"	0.011	"	0.008	"	0.000	"
13 OCT 80 AM	0.003	130.	0.006	37.	0.025	230.	0.000	48.
13 OCT 80 PM	0.001	"	0.009	"	0.009	"	0.001	"
14 OCT 80 AM	0.000	95.	0.002	200.	0.001	150.	0.000	130.
14 OCT 80 PM	0.002	"	0.008	"	0.007	"	0.000	"
15 OCT 80 AM	0.001	170.	0.002	47.	0.002	130.	0.000	40.
15 OCT 80 PM	0.002	43.	0.004	72.	0.007	"	01000	"
16 OCT 80 AM	0.001	"	0.001	"	0.002	140.	0.000	180.
16 OCT 80 PM	0.000	60.	0.001	100.	0.003	"	0.001	"
17 OCT 80 AM	0.001	"	0.002	"	0.001	40.	0.000	21.
17 OCT 80 PM	0.002	55.	0.004	70.	0.004	"	0.000	"
18 OCT 80 AM	0.001	"	0.005	"	0.002	38.	0.001	25.
18 OCT 80 PM	0.002	N.D.	0.005	60.	0.006	"	0.001	"
19 OCT 80 AM	0.001	N.D.	0.001	"	0.001	N.D.	0.000	N.D.
19 OCT 80 PM	0.001	N.D.	0.004	"	N.D.	N.D.	0.000	N.D.
20 OCT 80 AM	0.002	N.D.	0.005	N.D.	0.001	N.D.	0.000	N.D.
20 OCT 80 PM	0.002	N.D.	0.004	N.D.	0.002	N.D.	0.000	N.D.
21 OCT 80 AM	0.001	N.D.	0.002	41.	0.001	31.	01000	39.
21 OCT 80 PM	0.002	33.	0.001	"	0.004	"	0.000	"

NOTES: 1) DEF concentrations are shown in parts per trillion (ppt) averaged over the twelve hour collection period.

2) Silver Levels are shown as total micrograms (μg) collected. Quotation marks are used when the sampling period extended for two or more twelve hour periods.

TABLE 2 POSITIVE BUTYL MERCAPTAN CONCENTRATIONS SAMPLED BY
GAS CHROMATOGRAPHY DURING THE 1980 DEF STUDY

<u>Location</u>	<u>Date</u>	<u>Time</u>	PPB	<u>µg/m³</u>
Coalinga	10/03/80	2230	5.86 ¹	23.6
Dos Palos	10/04/80	0501	1.39	5.6
Dos Palos	10/04/80	2200	1.12	4.5
Dos Palos	10/05/80	2400	0.74	3.0
Dos Palos	10/05/80	0200	0.42	1.7
Dos Palos	10/05/80	0400	0.29	1 . 2
Dos Palos	10/05/80	1120	1.06	4.3
Dos Palos	10/05/80	1300	0.99	4.0
Dos Palos	10/05/80	1410	0.42	1.7
Dos Palos	10/05/80	1530	0.42	1.7
Dos Palos	10/05/80	1700	1.06	4.3
Lemoore	10/07/80	0100	0.42	1.7
Lemoore	10/07/80	0500	3.58	14.4
Lemoore	10/08/80	0100	0.59	2.4
Lemoore	10/08/80	0258	0.42	1.7
Lemoore	10/08/80	0507	0.42	1.7
Mendota	10/23/80	1040	4.87	19.6
Mendota	10/23/80	1140	9.70	39.0
Mendota	10/23/80	1240	7.45	30.0
Mendota	10/23/80	1340	4.17	16.8
Mendota	10/23/80	1550	1.98	8.0
Mendota	10/23/80	1715	5.36	21.6
Dos Palos	10/26/80	1400	1.79	7.2
Dos Palos	10/29/80	0915	3.92	15.8
Dos Palos	10/29/80	1001	7.45	30.0
Dos Palos	10/29/80	1100	6.45	26.0
Dos Palos	10/29/80	1157	8.94	36.0
Dos Palos	10/29/80	1447	5.86	23.6
Dos Palos	10/29/80	1746	9.93	99.3

1) Instantaneous Values at Time of Measurement

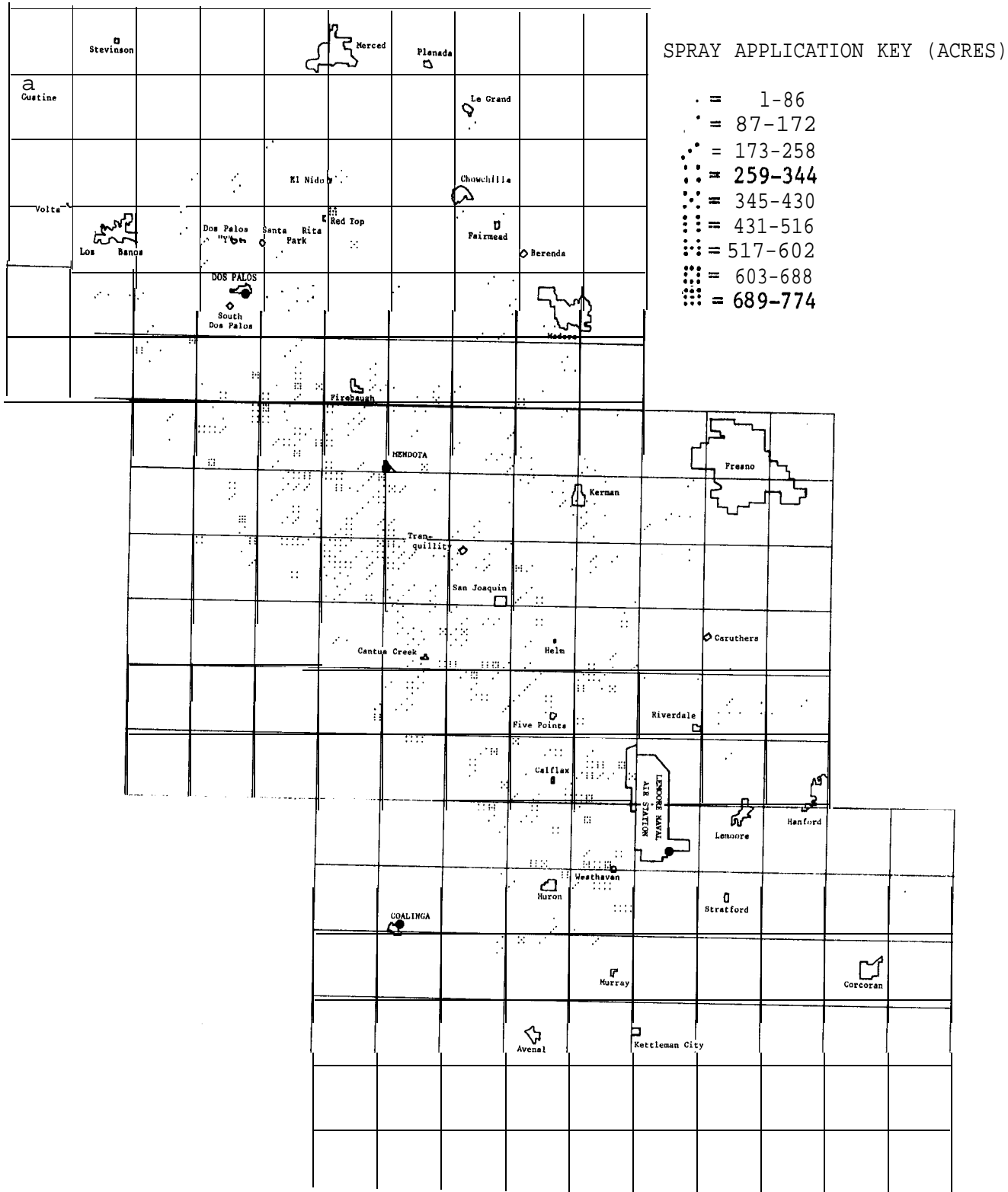


Figure 1. Aerial Application map showing township and range lines, cities and towns. The four sampling sites are represented by ●. Acres sprayed were summed and plotted for the 36 sections within each township-range square. The location reference for the upper left corner is T.07S, R.08E, S.06.