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CHEMICALLY TREATED GRASS AS A DEER REPELLANT AT A
SALISBURY, MARYLAND AIRPORT

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by
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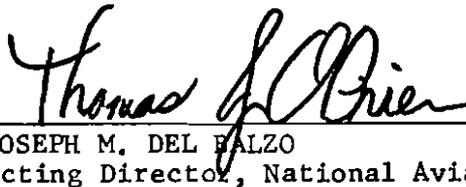
AUGUST 1979

**FEDERAL AVIATION ADMINISTRATION
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER
Atlantic City, New Jersey 08405**

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Approved by



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ABSTRACT

Numerous aircraft collisions with wildlife, primarily deer, happen each year at airports. To reduce the probability of such incidents, a test to discourage deer feeding on airport land using chemical treatment of grass was carried out. The chemicals used render the grass unpalatable to deer. Spotrete, a thiram based product, a known deer repellent, along with Pro-Tec 100, to provide long-lasting results was used at the Salisbury Airport (MD), to determine the effectiveness of keeping deer away from the runway and the immediate vicinity. The number and location of the deer on or near the runways were recorded before and after the application of the chemical. Observations were recorded over a 5 month period, November 1978 to April 1979. Grass samples were tested periodically for chemical content. The chemical remained on the grass longer than usual, however, it appeared that the treatment did not prevent deer from passing through the runway area.

INTRODUCTION

Purpose

We tested a specific chemical; namely, a Pro-Tec treated thiram to determine its effectiveness in keeping deer away from the vicinity of airports and in particular keeping them off the runways and taxiways.

Background

One hazard to aviation in the airport environment is deer on the operating surfaces of the airport. The open areas of the airport offer the deer a feeding and grazing area as well as a degree of freedom from surprise attack by predators. The airport provides an ideal place to pasture on short grass. Chemicals can be applied onto the grass that makes the grass unpalatable to deer. However, the chemicals can become ineffective in a short period of time as they can wash away during the first rainfall following the application. Means to provide longevity to the chemical were incorporated and tests on a small scale have been conducted previously at Mid-State Airport, Phillipsburg, Pennsylvania, and at the National Aviation Facilities Experimental Center in New Jersey. These tests showed some success in controlling deer on the airport (Ref. Letter Report NA-78-2-LR, "Deer Airport Strike Hazard (DASH).").

DISCUSSION

An additional test was planned to validate the results from the previous experiments; Salisbury Wicomico County Airport, Salisbury, Maryland, was selected as the test site. The airport area, 660 acres, was sprayed by aircraft (Figure 1) using a crop dusting technique. A continuous deer watch was kept with particular attention at dawn and dusk. The Flight Service Station personnel stationed at Salisbury Airport reported and recorded the deer sightings. Grass samples were taken periodically and analyzed to determine the chemical contents retained in the sample.

Repellant Description

The repellant mixture was composed of tetramethylthiuram disulfide (thiram), the active ingredient, mixed with a protective polymer which was intended to provide longevity against the weather and ultraviolet rays from the sun.

The quantities of the mixture used were 55 gallons of Pro-Tec 100 (the polymer), 440 gallons of water, and 72 pounds of Spotrete (75 percent thiram). Arasan 42 S (EPA Reg. #352-240) and Spotrete (EPA Reg. #1001-11) are the trade names of materials containing thiram.

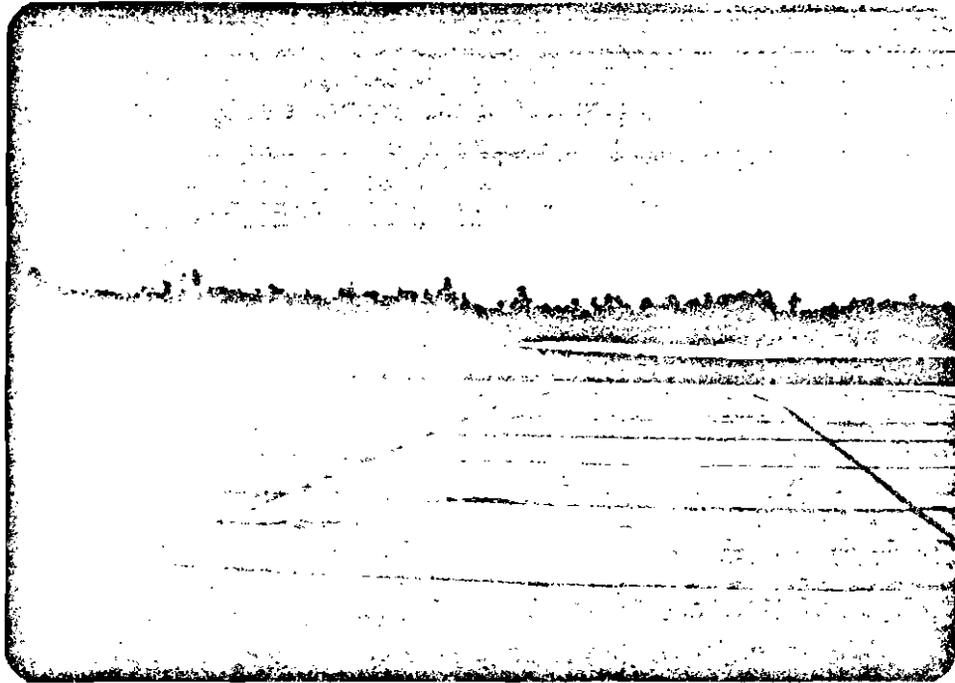


FIGURE 1. AIRCRAFT SPRAYING AIRPORT AREA.

Thiram has been available commercially for use as a turf and seed fungicide. Its effectiveness as a deer repellent has been suggested. Thiram is toxic to fish. Thiram may cause allergic reaction in humans and users are warned not to take alcohol before or after exposure. A latex-type resin rather than a wetting or spreading additive (surfactant) was suggested to prolong effectiveness as the use of a wetting agent or surfactant may cause severe crop injury.

Results

The number of deer, time of day, and location are recorded in Figures 2 and 2A, and are superimposed on a map of the Salisbury Airport, Figures 3 and 3A, the arrows indicate the direction of the deer movement. Figure 4 presents the analysis made periodically by the Fish and Wildlife Laboratory of the residual amounts of the chemical remaining on the grass samples.

After the grass was sprayed on December 13, 1978, fewer deer were sighted. The number of deer sighted ranged from a high of eight, 2 weeks before spraying to a high of three, 2 weeks after spraying. There were no sightings between January 6 through January 22. During this time, in January 1979, snow and freezing conditions prevailed. During February 1979, more frequently the deer were observed moving north to south and grazing during March 1979.

Figure 4 shows a decrease of thiram concentrate averaging approximately 30 parts per thousand per month from the spraying date of December 13, when 115.1 parts per thousand was measured until the last measurement on April 2, 1979.

Conclusions

1. Deer did not graze for a period of 3 months in the airport area where it was sprayed.
2. The cause of nongrazing cannot be determined from this test.
3. Deer, although they did not always graze, did pass over the sprayed airport area.
4. Average concentration of thiram on the grass blades tested decreased at an approximate average of 30 parts per thousand per month.
5. The Pro-Tec treated thiram did not keep deer off the runways, nor from the vicinity of the airport.
6. Results are similar to tests conducted by NAFEC, reported in Letter Report NA-78-2-LR, December 1977 - "Deer Airport Strike Hazard (DASH)."

Recommendations

None

DEER SIGHTINGS
Salisbury Airport, MD

| Date | Time (LCL) | Weather Conditions Sky Cond's. & Temp. | Number of Deer | Location on Airport Map | Remarks |
|-------|------------|---|-------------------|----------------------------|------------------|
| '78 | | | | | |
| 11/20 | 1700 | | 4 | 1 | |
| 11/30 | | | 1 | 2 | |
| 12/3 | 0715 | | 8 | 3 | |
| 12/3 | 1930 | | 1 | 4 | |
| 12/11 | 1050 | | 3 | 5 | |
| 12/12 | 1315 | | 1 | 6 | |
| 12/13 | ----- | SPRAYED----- | | 7 | SPRAYED 12/13/78 |
| 12/17 | 2030 | 40 SCT 38° | 3 | 5 | |
| 12/19 | 2232 | E120 BKN 250+7 36° | 1 | 8 | |
| 12/24 | 1500 | 80 BKN 250 OVC 7 40° | 3 | 9 | |
| 12/29 | 1050 | 250 BKN 15 28° | 1 | 10 | |
| '79 | | | | | |
| 1/6 | 1327 | 12 SCT E 80 OVC 44° | 1 | 10 | |

Most of the above is self explanatory. Column headed "location on map" use a number corresponding to the same number on map; e.g., sight #1 on map should be listed above and recorded on map as #1 sighting. Remarks column should be used to identify a group of deer as being the same as a previous sighting. Or any other remarks that may be pertinent.

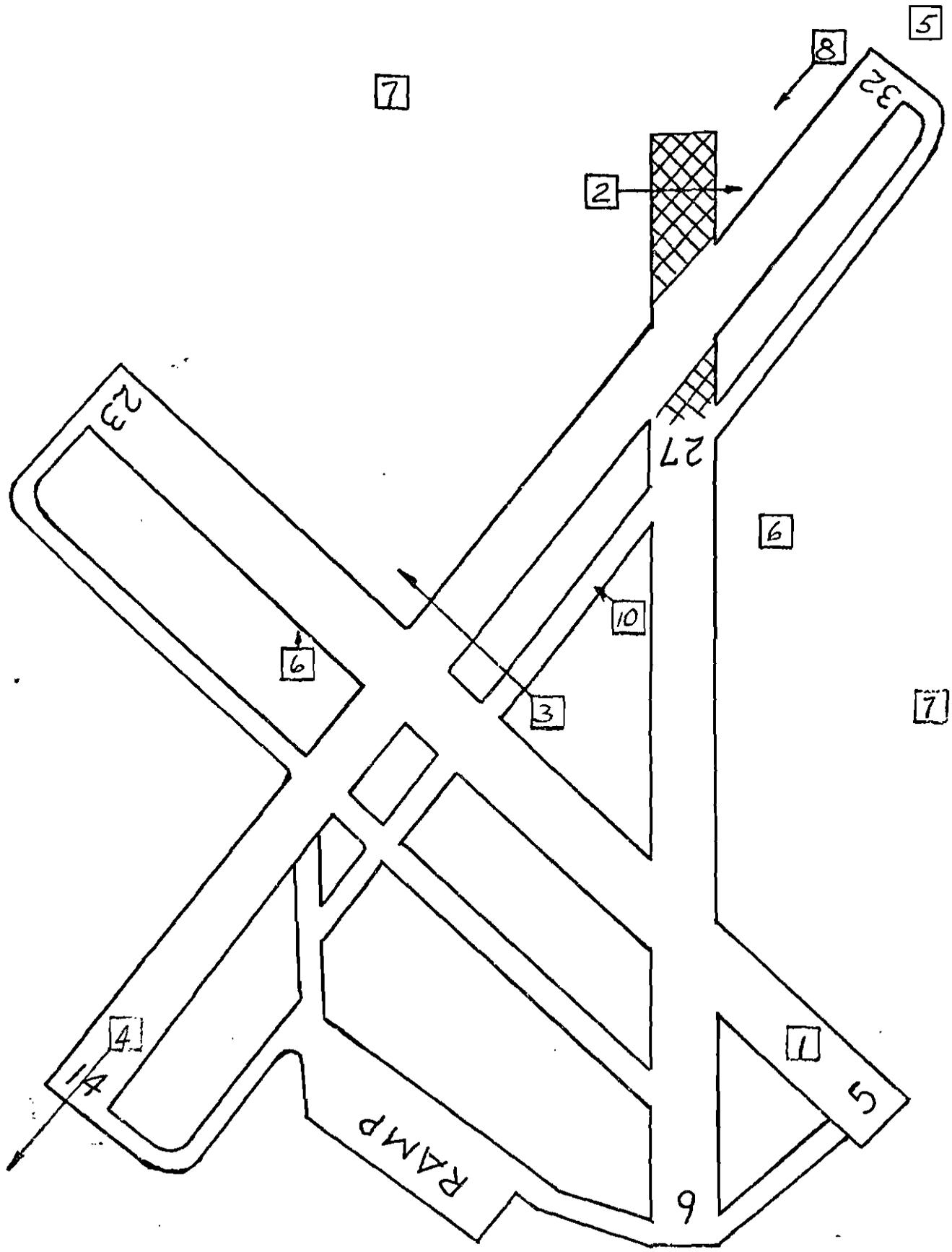
Figure 2

DEER SIGHTINGS
Salisbury Airport, MD

| Date | Time (LCL) | Weather Conditions Sky Cond's, & Temp. | Number of Deer | Location on Airport Map | Remarks |
|------|------------|---|-------------------|----------------------------|--|
| 1/23 | 0805 | CLR 5 24° | 4 | 15 | Moving from N to S obsd. (small deer) |
| 1/29 | 0830 | E80 BKN 40° | 4 | 6 | Moving N to S obsd. |
| 2/4 | 0929 | E60 OVC 5H | 4 | 7 | |
| 2/6 | 0800 | E100 BKN 250 BKN | 4 | 16 | Moving N to S obsvd. |
| 3/2 | 0845 | X3 OVC 1F | 1 | 4 | Moving N to S |
| 3/2 | 0915 | X7 BKN 2F | 2 | 4 | |
| 3/2 | 0950 | 20 SCT 3F | 1 | 7 | Moving S to N |
| 3/3 | 1630 | X8 OVC 2FH | 5 | 10 | Moving N to S |
| 3/5 | 1015 | E40 BKN 3GF 65° | 1 | 11 | Ranged over large area of airport |
| 3/8 | 0850 | 150 BKN 3GF | 3 | 12 | Eating-left 0933 |
| 3/12 | 0830 | 25 SCT 10(33) | 2 | 13 | Eating |
| 3/13 | 1345 | 250 OVC 20 | 4 | 15 | Obsd. |
| 3/14 | 1100 | 24 SCT E60 BKN 150 OVC vs by 10 | 4 | 14 | |

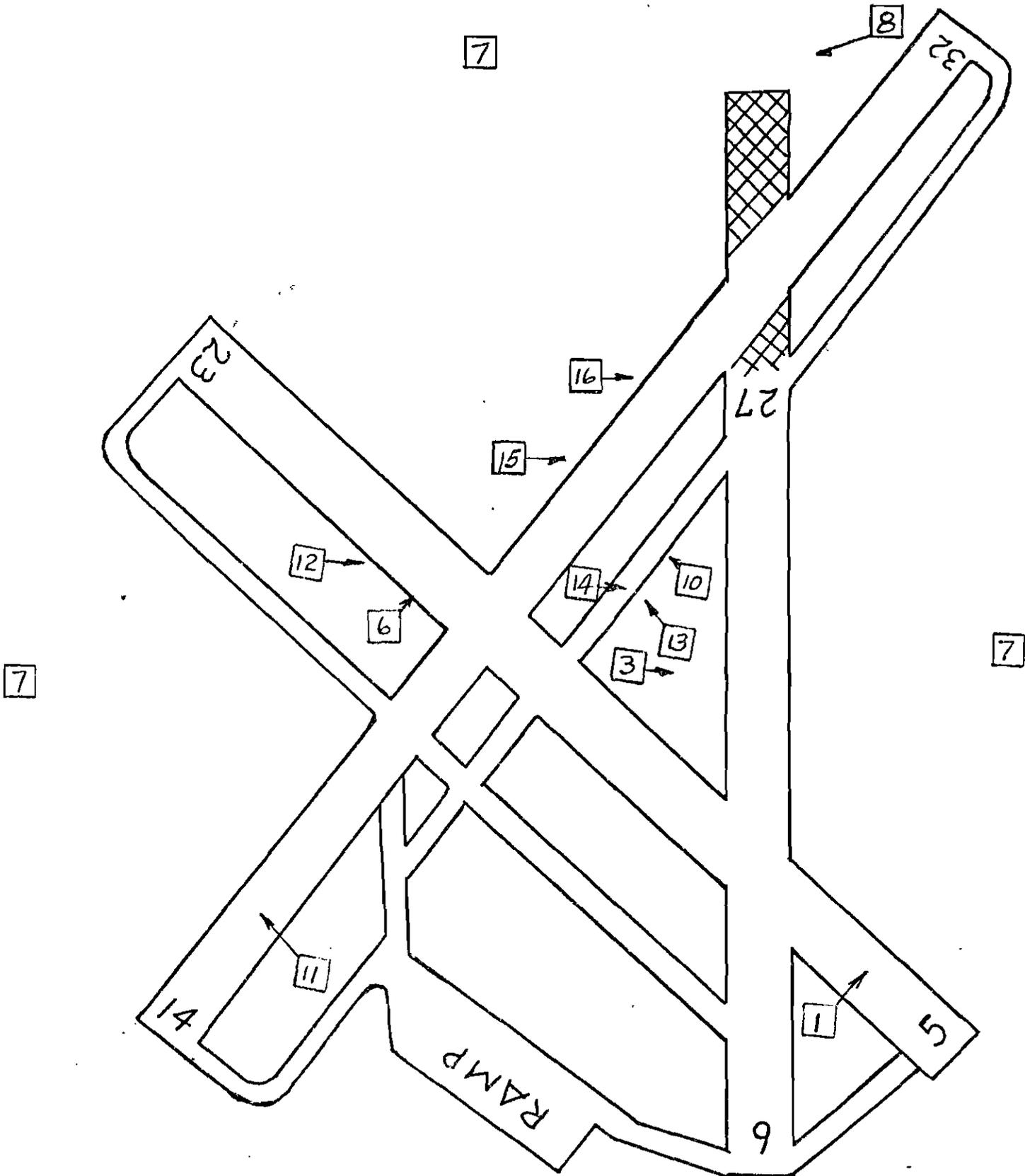
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Figure 2A



7

Figure 3



7
Figure 3A

Residue of Thiram Measured

(Period of 4 Months)

| | <u>Parts Per Thousand Thiram</u> |
|---------------------------------|----------------------------------|
| December 13 Prior to Spraying | 1.1 |
| December 13 Just after Spraying | 115.2 |
| February 2 - 1 1/2 months | 75.4 |
| March 2 - 2 1/2 months | 45.2 |
| April 2 - 3 1/2 months | 12.7 |

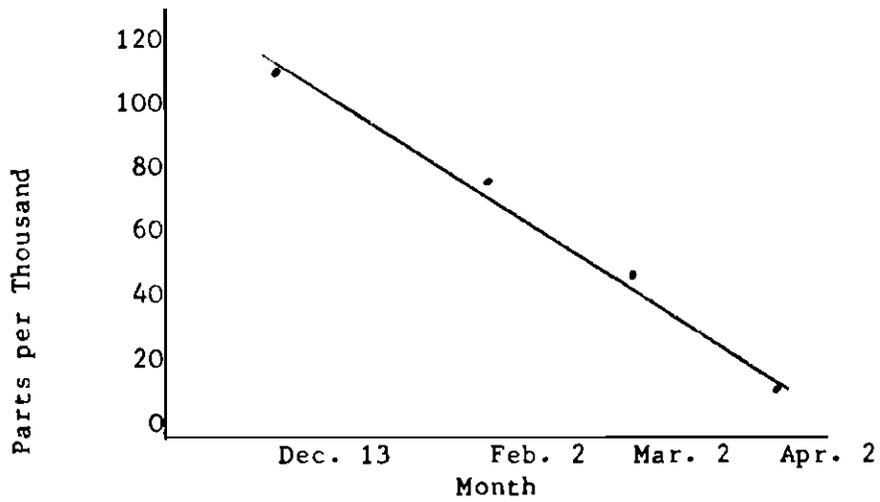


Figure 4