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SHEFFIELD MEMORANDUM NO: 11/69

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DEFENCE RESEARCH ESTABLISHMENT SHEFFIELD
WALSFOOT ALBERTA

PRO - 11-11-69 TO EA
IN FIELD EXPERIMENT NOY 593,

OK

DOWNWIND TRAVEL OF HERBICIDES.

by

16 D. J. Currie

PROJECT AUTHORIZED IN DRB 6800-1-1 dated

~~3 Jul 1969~~

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WARNING

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DOWNWIND TRAVEL OF HERBICIDES.

(Procedures to be used in Field Experiment
No: 593).

1. REFERENCES

- a. SRC letter dated 14 May 69 (DRES 221-50/3).
- b. Proposed pesticide field trial program, prepared by SRC 23 Jun 69
- c. DRB 6800-1-1 dated 3 Jul 69.

2. PURPOSE

The purpose of this trial is to determine the amount of 2,4-D ester that is likely to drift from a typical ground application of the material under several weather and spraying conditions.

3. SCOPE

The experiment will consist of two to four trials which will be conducted under weather conditions typical of spraying operations as conducted on farm land. Measurements will be made of liquid, vapour and aerosol contributions from herbicide put on a layout of cross-wind dimension 150 meters, downwind dimension 12.5 m. The desired ground coverage (sprayed material is 4 g/m^2).

4. SITE

Vertical Grid layout.

5. WEATHER

- a. Wind direction - any.

- b. Wind speed - 4 - 10 m.p.h.
- c. Air Temperature - not higher than 95°F.
- d. Weather - No precipitation during trial period or previous 24 hours.
- e. Stability - Near neutral to moderate lapse.

It is desirable that single trials be conducted under each of the following weather conditions:

<u>Trial</u>	<u>Temperature (°F)</u>	<u>Wind Speed (m.p.h.)</u>
1	55-75	4-8
2	75-90	4-8
3	55-75	12-16
4	75-90	12-16

6. MATERIAL

- a. 2, 4-D butyl ester dyed 1% Nigrosine Black (provided by SRC).
- b. Agricultural boom sprayer (nozzles provided by SRC).
- c. Pie plates - 45.
- d. Cascade impactors - 12.
- e. DRLS bubblers - 500 maximum.
- f. Bubbler racks - 14.
- g. Paper samplers (9 in x 6 in sheets on 18 inch square jump cards) - 36.
- h. Gasoline pumps - 19.
- i. Aerosol samplers (pipe cleaners) - 14.

7. LAYOUT

Figure 1 is a diagram of the trial layout.

8. PROCEDURES

- a. All samplers will be set out prior to zero at positions dictated by wind direction. Pie plates will contain no solvent. Aerosol samplers will be placed at 1/2 m and 1 m on the 30 m and 75 m sampling areas.
- b. A meteorological OP as designated by the FEO will be set up to take meteorological measurements during the trial period.
- c. After ground samplers have been positioned a trial run will be made by the boom sprayer crew to ensure their familiarity with the layout and to achieve the desired traverse speed. The apparatus will then be charged with the material to be sprayed in an area designated by the FEO.
- d. On instructions from the FEO, the layout will be sprayed in a single pass. The start of the spray will be zero for the trial.
- e. Pie plates will be capped and picked up as soon as possible after the boom sprayer has completed its pass. Jump cards will be recovered immediately following this recovery.
- f. Vapour samples will be taken at 1/2, 1, 2, 3 and 5 m on the 30 m arc and 1/2, 1, 2, 3, 5, 7 and 9 m on the 75 m arc.

VAPOUR SAMPLING SCHEDULE

9. Arc	Interval (mins).
30 m	0-1/2, 1/2-2, 2-10, 10-30.
75 m	0-1/2, 1/2-2, 2-10, 10-30
125 m	0-2, 2-10, 10-30
300 m	0-30.

METEOROLOGICAL OBSERVATIONS

The following meteorological information is required during each trial.

- a. Wind speeds at 1/2, 2 and 10 m.
- b. Wind direction at 2 m.

- c. Air and surface temperatures.
- d. Temperature gradient 4 m - 1/2 m.
- e. Relative humidity.
- f. Cloud conditions and sunshine.

ADMINISTRATION

11. H/TECH S In charge of trial. Layout preparation. Record zero and spray run times. Provide spray apparatus. Sample of sprayed material to CHEM S. Mix 2, 4-D ester, water and dye as directed by SRC.

H/CHEM

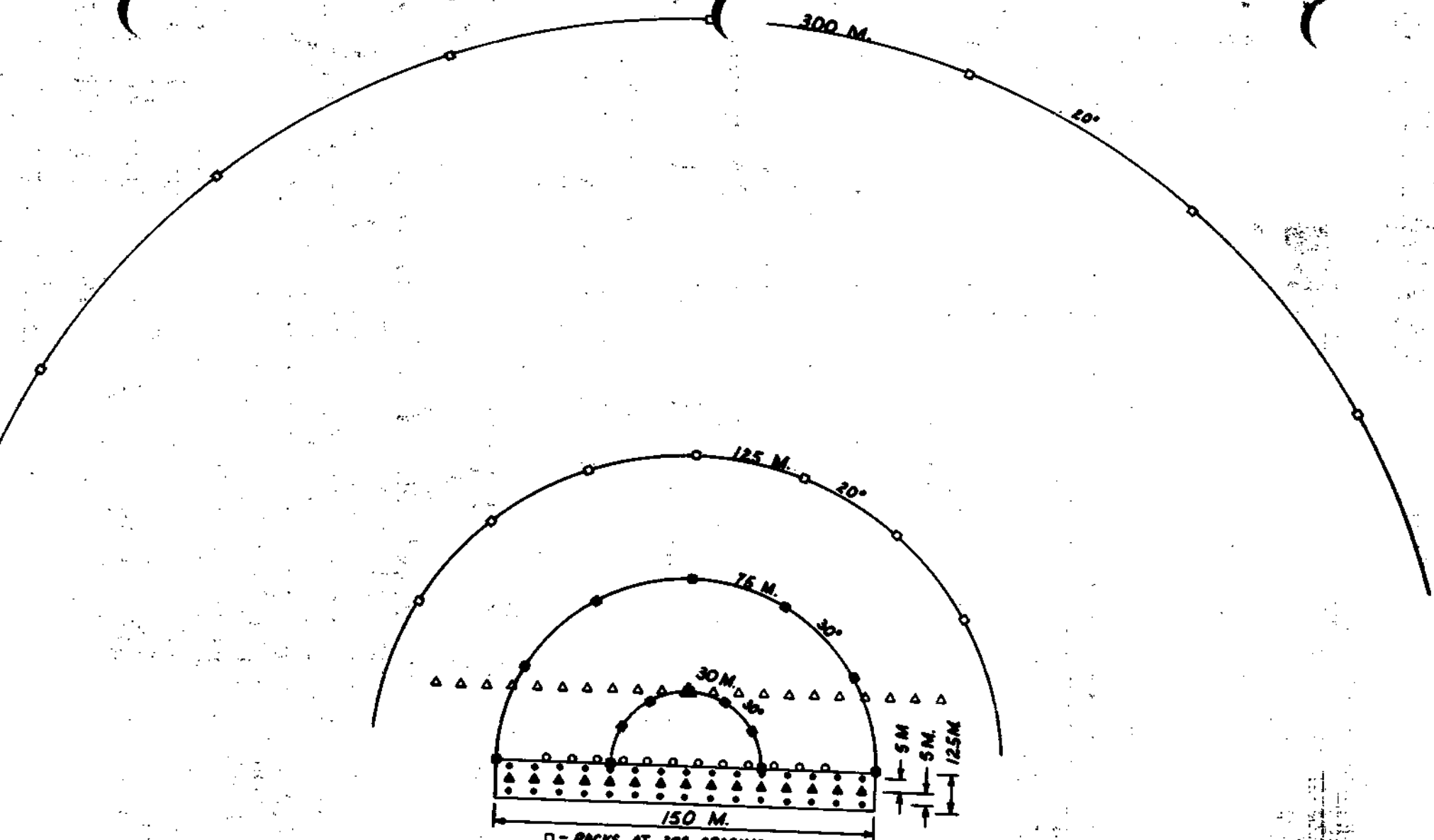
Provide Chemical test team, samplers and chemical analysis. Co-ordinate sampling schedule and record sampling times. Prepare samples for despatch to SRC.

H/MET

Forecast and meteorological observations.

SRC

Provide 2,4-D ester. Assist in layout and in chemical analysis. Additional analysis as required.



- - RACKS AT 20° SPACING
- - POLES AT 30° SPACING (Bubble & pipe cleaners)
- - PIE PLATES AT 10 M. INTERVALS
- △ - JUMP CARDS AT 10 M. SPACING
- - CASCADE IMPACTORS AT 10 M. SPACING

SUFFIELD MEMORANDUM NO: 71/69

DOWNWIND TRAVEL OF HERBICIDES

FIELD EXPERIMENT NO: 593

AMENDMENT NO. 1

by

D. J. Currie

1. PROCEDURES - Paragraph 8f should be amended to read:

"Vapour samples will be taken at 1/2, 1, 2, 3 and 5 m in the 30 m arc, and in the 75 m arc, between the sprayed area and the centre line of the layout. Beyond the centre line, vapour samples will be taken at 1/2, 1, 2, 3, 5, 7 and 9 m heights. Vapour samples will be taken at 1/2 m and 1 m in the incomplete segment of the layout, where poles are not yet provided, should wind direction dictate the use of this portion of the vertical grid layout.

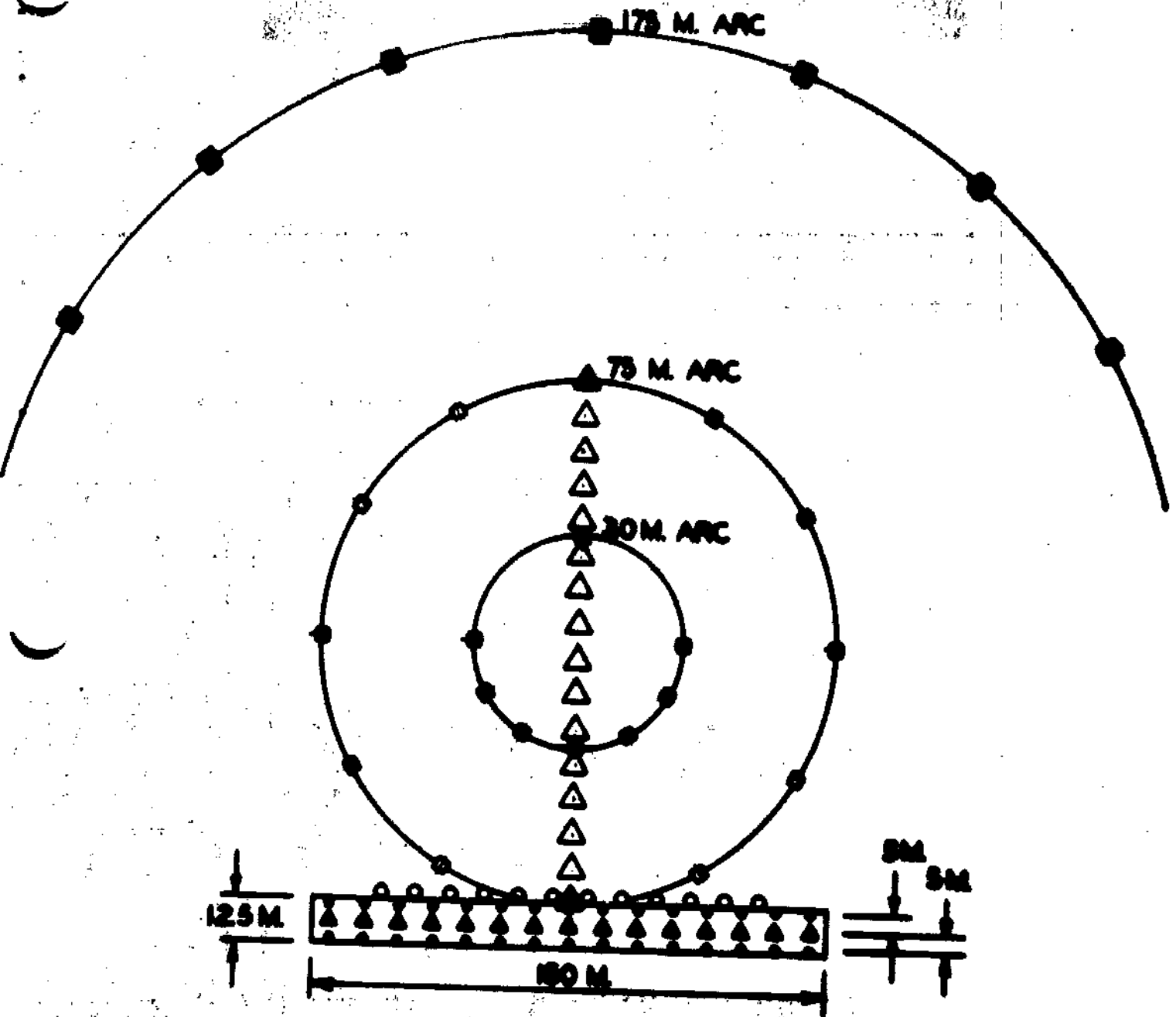
2. VAPOUR SAMPLING SCHEDULE - Paragraph 9 should be amended to read:

Arc	Interval (mins)
30 m	0-2, 2-10, 10-30
75 m	0-2, 2-10, 10-30
175 m	0-30

3. FIGURE 1 - TRIAL LAYOUT;

Insert new Figure 1 attached.

REVISED TRIAL LAYOUT



- - RACKS AT 20° SPACING
- - POLES AT 30° SPACING
- - PE PLATES AT 10 M. INTERVALS
- △ - JUMP CARDS AT 10 M. INTERVALS
- - CASCADE IMPACTORS AT 10 M. INTERVALS

(ARC RADII ARE SHOWN FOR EXISTING SAMPLING ARCS OF VERTICAL GRID LAYOUT)

28 JULY, 1960