

2,4,5-T ACID BUSINESS PLAN

SUMMARY OF PRESENTATION BY THE
PESTICIDE PRODUCT BOARD TO THE
OPERATING COMMITTEE, JAN. 25, 1968

EX 50

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SCHEDULE 4

2,4,5-T Plan

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January 25, 1968

2,4,5-T ACID & DERIVATIVES

SUMMARY OF PROFITABILITY

	<u>1962</u>	<u>1964</u>	<u>1967</u>
Volume - M lbs. Technical			
Technical	2195	1947	355
Formulation	528	232	485
Defense	<u>228</u>	<u>1149</u>	<u>5028</u>
Total	2951	3328	5868
Sales - \$M	\$2.97	\$3.23	\$6.70
Gross Profit	0.84	0.76	2.63
% Margin	28%	24%	39%
Net Income	.22	.17	.88
ROI	6.3%	4.8%	17.8%

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2,4,5-T COST & INVESTMENT

	<u>MANUFACTURING COST</u>			<u>INVESTMENT</u>	
	<u>Use</u>	<u>Price</u>	<u>c/lb.</u> <u>2,4,5-T</u>	<u>\$M</u>	<u>c/lb.</u> <u>2,4,5-T</u>
TCB	1.00	16.3	16.3		
Acetic/MCA			4.9		
Other Raw Mtl.			<u>6.9</u>		
			28.1	0.1	1.7
			<u>21.7</u>		
Conversion			49.8		
Shipping			?		
Misc. Allocations & Working Capital				<u>2.4</u>	<u>41.0</u>
				4.9	84c

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2,4,5-T Plan

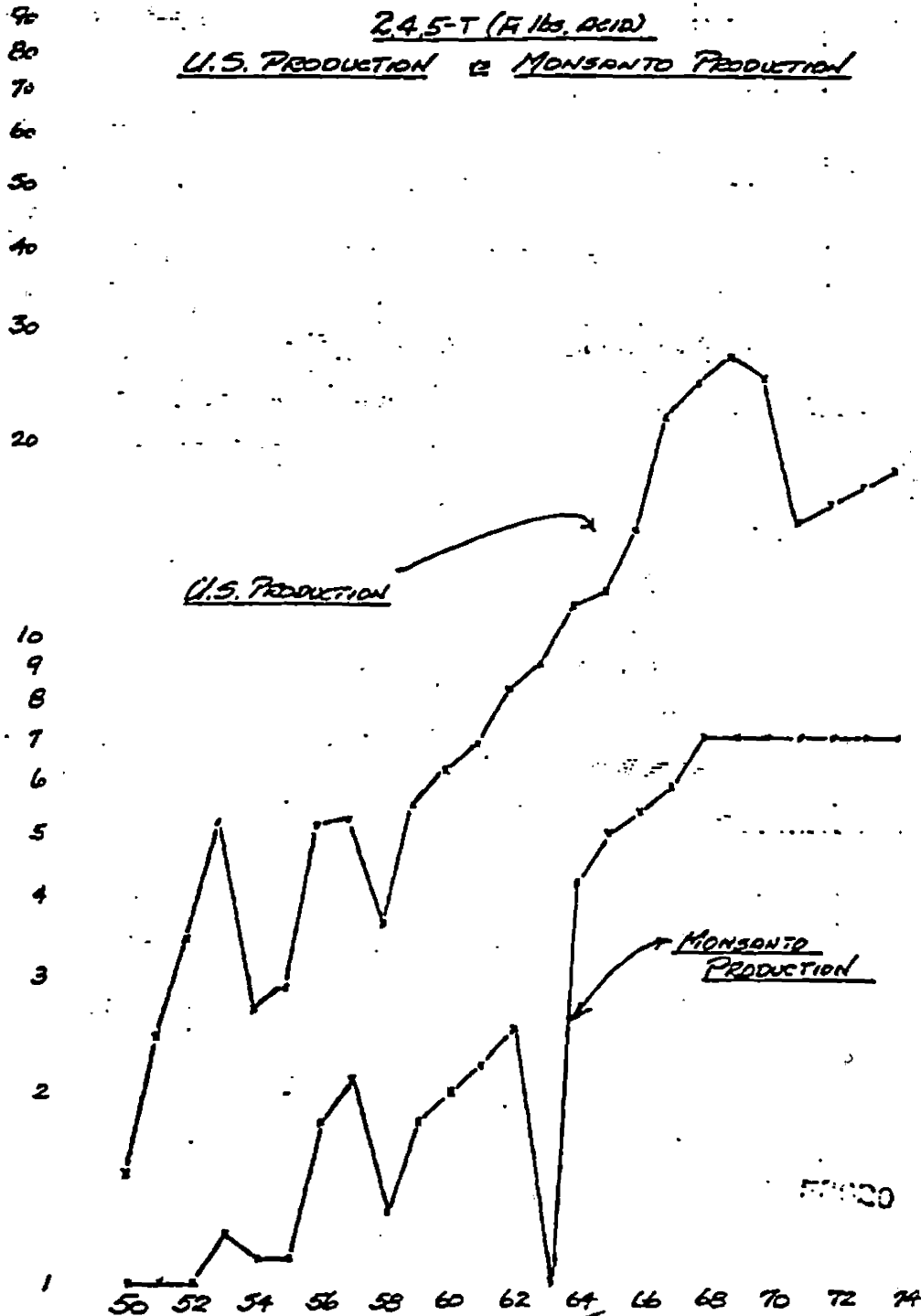
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January 25, 1968

100 Mlbs. Acid

2,4,5-T (Hlbs. Acid)

U.S. PRODUCTION & MONSANTO PRODUCTION



SCHEDULE 4

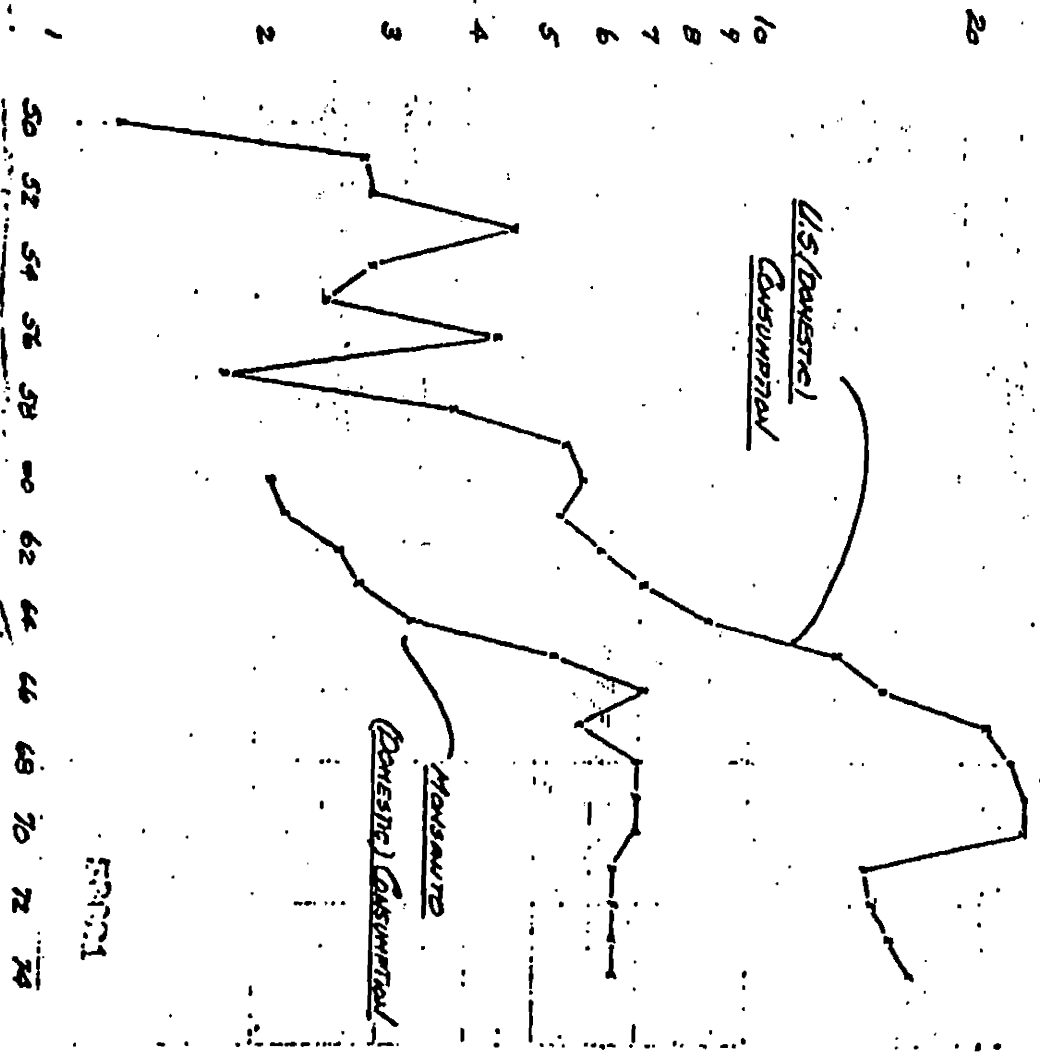
24.5-T Plan
(Hrs. And)

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24.5-T (Hrs. And)

(1.5 (Domestic) Consumption
AND
Manufact (Domestic) Consumption



SCHEDULE 4

MONSANTO SALES

2,4,5-T
By Markets
M lbs. Acid

Year	Total Sales M lb.	Total Tech. M lb.	Total Indust. M lb.	Total Agr. M lb.	Total Export M lb.	Total Defense M lb.
1960	2.5	2.0	—	0.2	0.4	—
1963	3.0	2.3	0.1	0.2	—	0.4
1966	7.2	2.0	0.3	0.1	—	4.8
1967	5.9	0.3	0.3	0.2	—	5.1
1968	7.1	—	—	—	—	7.1

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2.4.5-T Plan

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U.S.
2,4,5-T

U.S. Consumption By Markets

Year	Total Used	Total Agr.	Total Defense	Total Indust.	Total Export
	M lbs.	M lbs.	M lbs.	M lbs.	M lbs.
1960	5.9	0.7	---	4.2	1.0
1962	7.3	1.0	---	5.2	1.1
1963	8.6	1.2	0.4	5.5	1.5
1964	10.6	1.1	1.6	5.8	1.8
1966	16.3	0.9	10.5	4.0	0.9
1967	21.5	0.9	18.5	2.1	---
1968	24.9	---	23.8	---	---

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2,4,5-T PLAN

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U.S. PRODUCERS

2,4,5-T

H lbs. Acid

Producer	1960 Mlb.	1962 Mlb.	1964 ^a Mlb.	1966 Mlb.	1967 Mlb.	1968 Mlb.
Estimated Production						
Monsanto	2.0	2.5	4.2	5.4	5.9	7.0
Dow Chemical	2.9	3.4	3.9	3.9	8.4	8.4
Diamond	0.8	1.0	1.0	1.5	1.5	1.5
Hercules	0.5	0.6	1.5	2.0	3.9	3.9
Thompson Chem.	0.2	0.2	0.2	0.8	1.0	1.0
Thompson- Hayward	—	0.5	0.5	1.0	1.1	1.1
Baird & Mc Guire	—	—	—	0.2	0.2	0.2
Hoffman Lab.	—	—	—	—	—	1.8
TOTAL	6.4	8.4	11.3	14.8	22.0	24.9

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2,4,5-T

Producers Cost Position

Capacity - M lbs. Acid

Producer	Capacity M lbs.	Raw Material Position			Rating	Est'd Cost ¢ lb.
		TCB	CL/CA	MCA		
		Make or Buy				
Monsanto	7.0	B	M	M	Good	0.56
		TCB@	22¢			0.50
		TCB@	16¢			
Dow Chem.	6.4	M	M	M	Excel.	0.48
•Diamond	1.5	B	M	M	Good	0.58
•Hercules	3.9	B	B	M	Fair	0.62
Thomp.Chem.	1.0	B	B	B	Poor	0.75
*Thomp. Bay'wd.	1.1	B	B	B	Poor	0.64
Baird-McGuire	0.2	B	B	B	Poor	0.78
**Hoffman Labs.	1.8	B	B	B	Poor	0.75
TOTAL	24.9					

* Thompson-Bayward has a European position thru Phillips-Borane which would change above.

** Hoffman Labs. - Production capacity computed from 2,4-D estimated requirements for Orange Band contract. Raw material position not basic.

• Diamond buys TCB in "Pigs". Hercules buys TCB in "Flake"

2,4,5-T

Definition of Potential Markets
H lbs. AcidMARKETS

Industrial	1960	1965	1968	1969	1971	1974
Counties	0.7	0.6	---	---	1.1	1.2
States	0.8	0.8	---	---	1.5	1.8
Irrigation	---	0.1	---	---	0.6	0.9
Dist.						
Federal (Don.)	0.6	0.6	---	---	1.7	2.0
Forestry	0.3	1.0	---	---	2.8	4.0
Power &	0.9	1.4	---	---	2.3	1.9
Commun.						
Pipe Lines	0.1	0.1	---	---	0.6	1.0
Tree Serv.	0.5	0.5	---	---	2.6	3.0
Railroads	0.5	0.4	---	---	1.6	1.5
Sub Totals	4.4	5.5	1.2	---	14.8	17.3
Defense	---	5.7	23.8	24.9	---	---
Export	1.0	0.7	---	---	0.9	1.9
Agriculture	0.7	1.3	---	---	1.0	1.4

TOT. EST'D. POT. 6.1 13.2 24.9 24.9 16.7 20.6

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2,4,5-T

MONSANTO CUSTOMER MIX
Historical & Forecast
(Without Defense)

	1964 M lb.	1967 M lb.	1972 M lb.
<u>Technical</u> \$NB/lb.	1.9 \$ 0.81	0.4 \$0.88	2.5 \$ 0.75
<u>Industrial</u> \$NB/lb.	0.1 \$ 0.73	0.3 \$1.47	3.7 \$ 0.90
<u>Agriculture</u> \$NB/lb.	0.1 \$ 0.84	0.2 \$1.38	0.3 \$ 0.90
<u>Export</u> \$NB/lb.	— —	— —	0.5 \$ 0.70
<u>TOTAL</u> \$NB/lb.	2.1 \$ 0.816	0.9 \$1.144	7.0 \$ 0.832

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2,4,5-T

Conclusions:

1. Agriculture is not a big future market.
2. Industrial Market is large, steady and growing.
3. Competitive activity after 1970 (assume Vietnam will end by then) will require "Price Action". Marginals will wash out.
4. Our Target-Direct sales; Contractual agreements; competitive prices; Team-up with Key Service Companies.
5. 1971-1974 potential market of 17-20M lbs. will be met with Domestic capacity (after price action) of 20-21M lbs.
6. Dow's Tordon is back in the market. It will win market acceptance in some use areas during period 2,4,5-T is totally committed to Defense.
7. More technical assistance with frequent customer contact would improve our position.

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2,4,5-T MANUFACTURING COSTI. Costs:

<u>Raw Mat.</u>	<u>c/lb.</u>
TCS	18.6
MCA	5.8
Caustic	2.6
H ₂ SO ₄	1.8
Methanol	.7
	29.5
Direct	12.3
Indirect	4.5
R & S	1.0
	47.3c

<u>History</u>	<u>c/lb.</u>
1967	49.5
1966	50.7
1965	50.2

II. Potential:

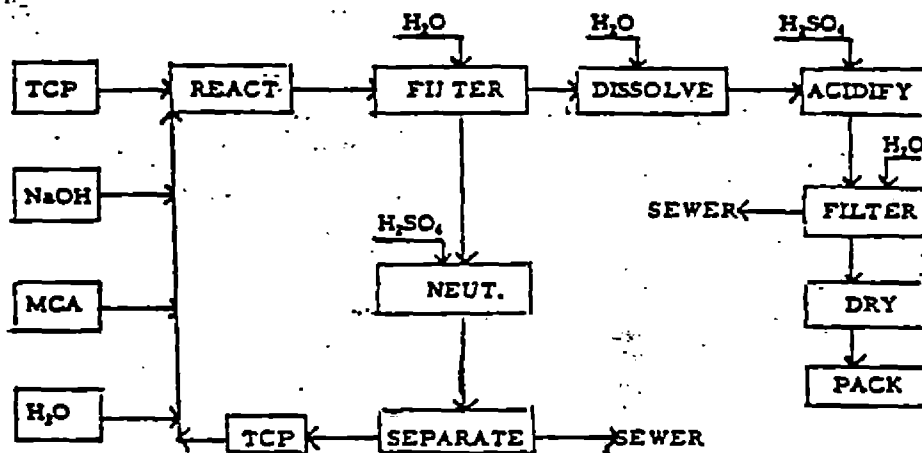
Small - Productivity and cost savings.

III. Problems:

Chloracne and Quality (—Color—?)

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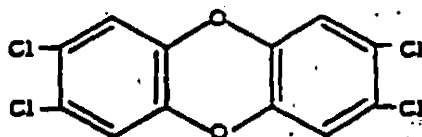
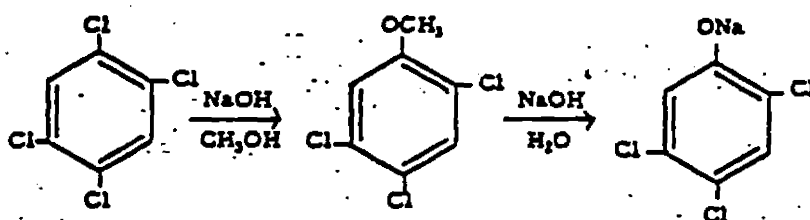
2,4,5-T PROCESS



This is a flow diagram of the 2,4,5-T process as carried out in the Nitro plant. Monochloroacetic acid, 2,4,5-trichlorophenol, and caustic are reacted in aqueous media to produce sodium 2,4,5-trichlorophenoxyacetate. The product is isolated by the steps shown above.

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SODIUM TCP

"TDD"

Sodium 2,4,5-trichlorophenoxide, the key raw material for T-Acid, is made in an autoclave operation by the reaction shown above. The product as made at Nitro by this sequence causes chloracne in humans. The compound, shown as TDD above, is one, and perhaps the only, major chloracnegen in our product. This material is known to carry through the T-Acid process giving product containing 3-50 ppm.

We have initiated a major Research program directed to eliminating the formation of TDD in the Nitro operation. It will continue at least through 1968.

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