

ABERDEEN CHEMICAL PLANT

1981

ANNUAL REVIEW

MARCH 17, 1981

DTH 000100396

DTH 000100397

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SAFETY
1981 REVIEW

- I. Injury Trends (Chart I)
- II. Chemical Exposure Trends (Chart II)
- III. Lead exposure Control Trends (Chart III)
- IV Noise Control Progress
- V Expansion Equipment Installed Without a Loss Producing Incident.
- VI Four Phase Fire Water Improvement Project.

NEW PAGE

SAFETY
1982 PLANS

I. Injury Goals	
A. Lost Time	0
B. Medical Cases	4
C. First Aid	32
TOTAL	<u>36</u>

II. Safety Program - Key Elements Emphasis

III. Work Environment

- A. VCM Overexposure Control Program
- B. Chemical Exposure Abatement Program
- C. Medical Division Noise Survey - April
- D. Reduce frequency of VCM Charge line Pluggage and Burnout. Revise Burnout Procedure.

IV. Complete Phase III Fire Protection and Engineer Phase IV.

V. Complete Installation of the Emergency Reactor Cooling and Emergency Kill Projects in the Vinyl Areas.

VI. Complete Installation of Lightning Agitation Systems on D-500 & D-600 Reactors. Complete Engineering of Lightning Agitation Systems on D-300 & D-400 Reactors.

Contractor Program
ESAR's & Meetings

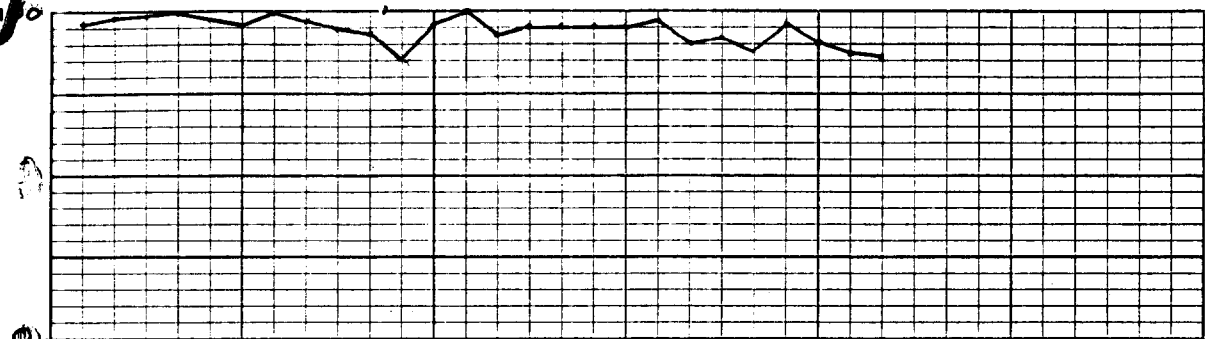
See Change Plot for

for Element Overhead

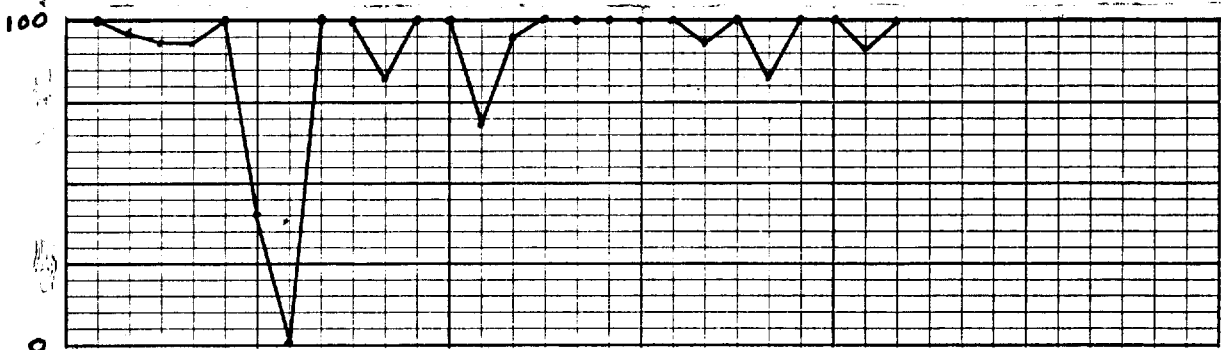
ABERDEEN CHEMICAL PLANT
CHEMICAL DOSIMETRY TRENDS

027
REL
100

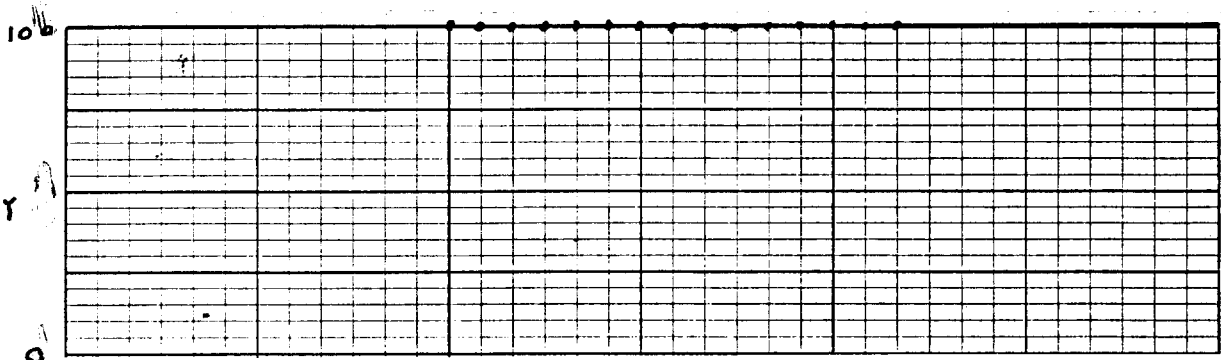
VCM



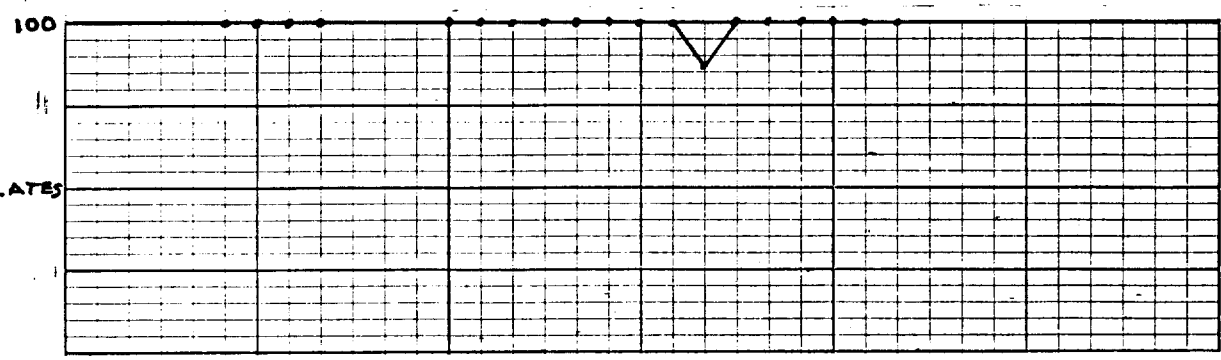
LEAD



ANTIMONY



TOTAL PARTICULATES

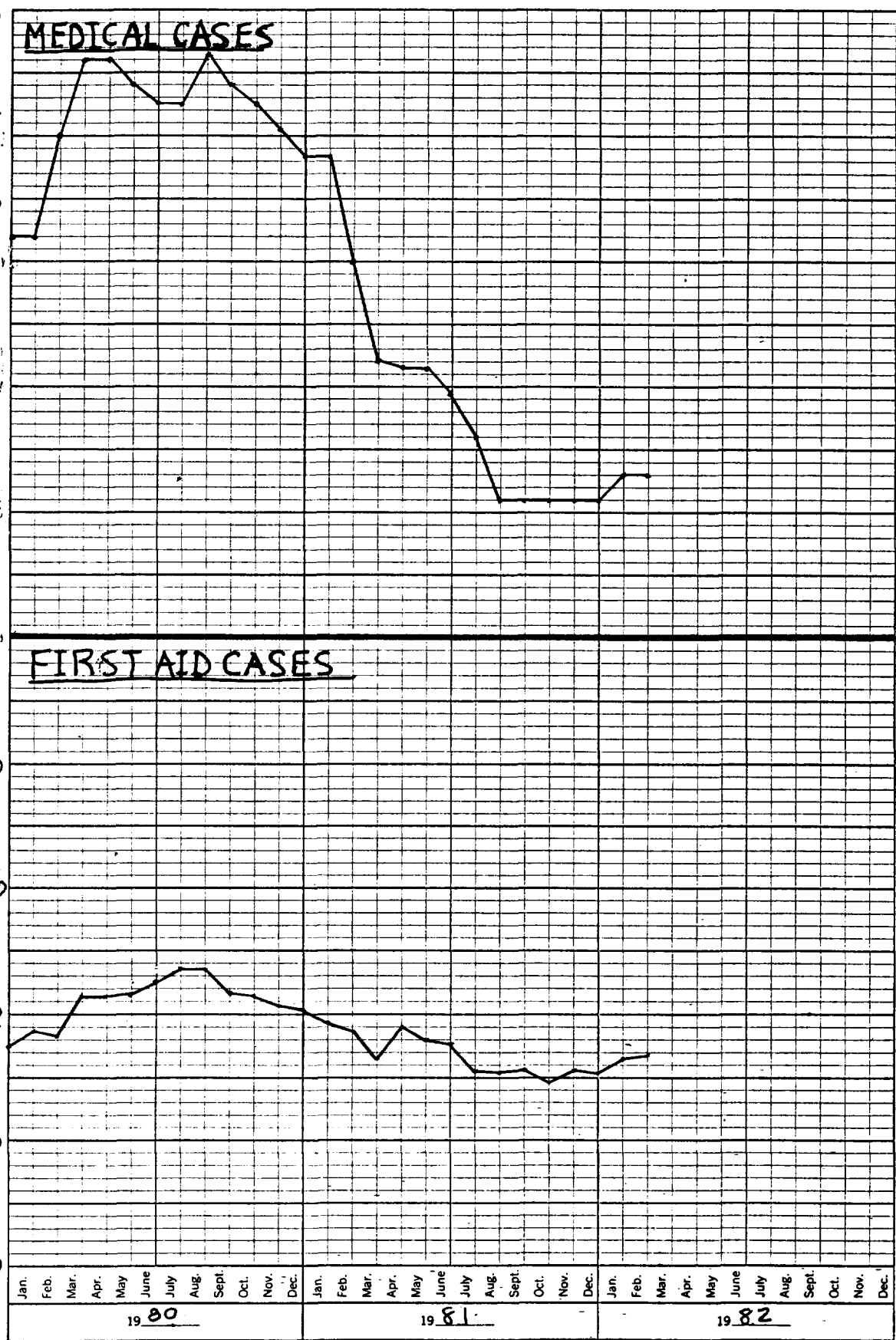


Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
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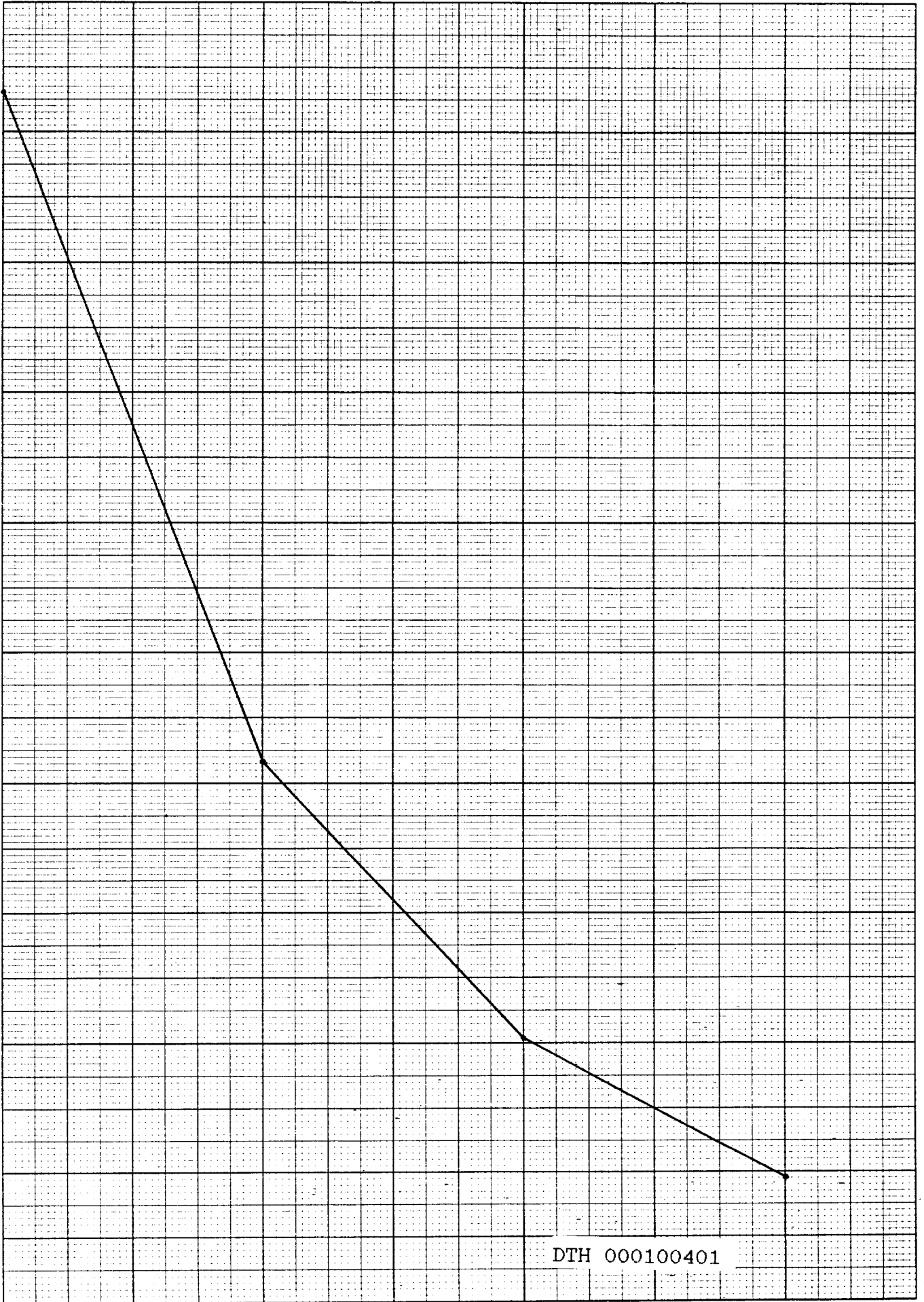
ABERDEEN CHEMICAL PLANT
INJURY PERFORMANCE



Injury Frequency X 100



FREQUENCY = $\frac{\text{Injuries (f.a. + m.c.)} \times 12}{\text{Total Employees}}$



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SAFETY

1980 REVIEW

- I. Injury Trends (See Chart I)
- II. Monthly Safety Meetings on specific topics selected by Safety Director. Films used to support topics whenever possible.
- III. Attitude Emphasis - Meetings conducted in October with Supervisory Personnel on a departmental basis focused on efforts needed to improve injury/accident prevention. November Plant Safety Meetings conducted by Safety Director with Management representation focused on injury/accident prevention and open discussion of safety problems.
- IV. Phase I Fire Protection Improvement Project completed.
- V. Initiated use of 3M "Airhat" respirator in Compound Department to reduce employee exposure to lead (See Chart II).
- VI. CED Noise Survey

SAFETY

1981 PLANS

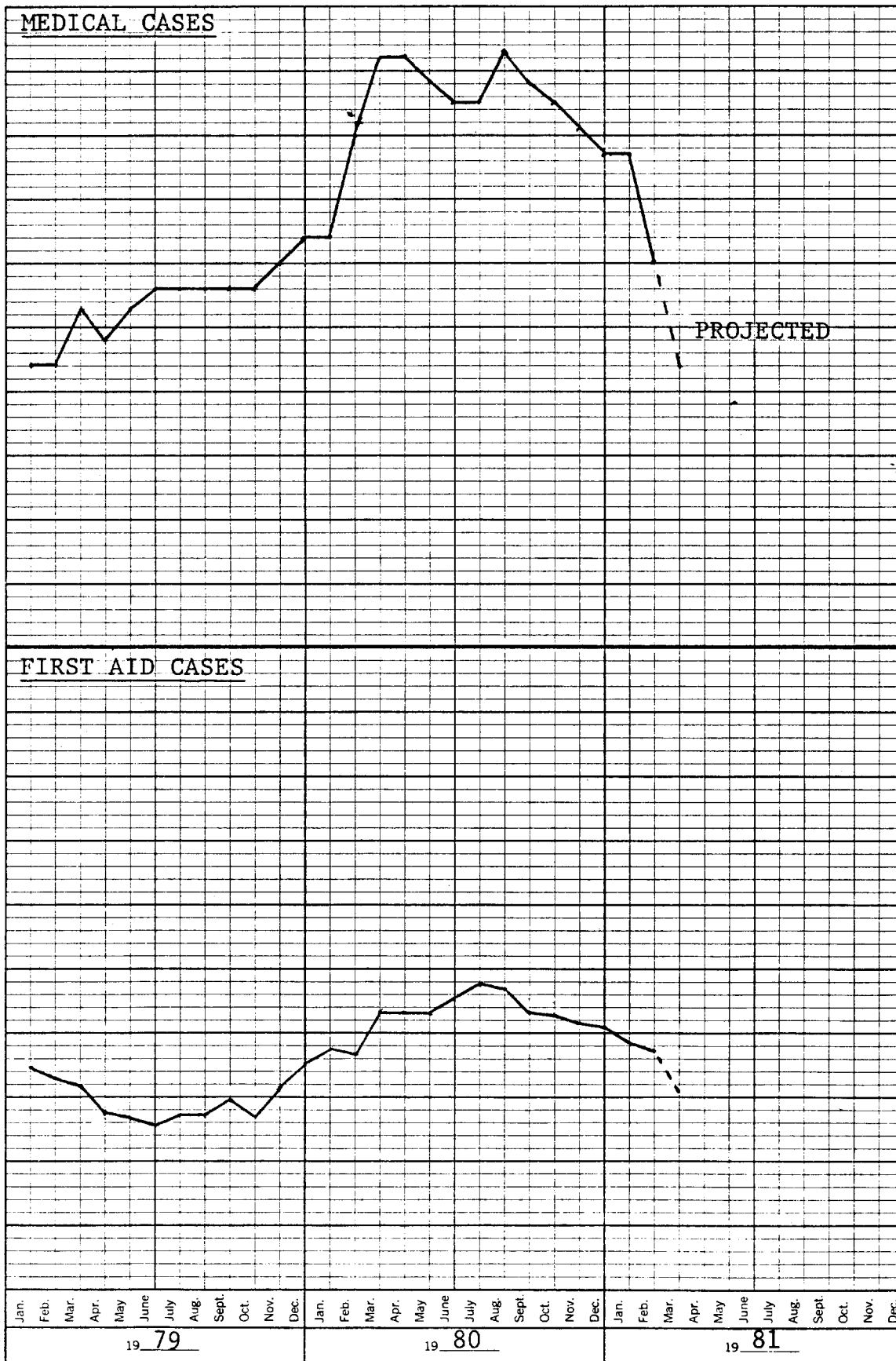
- I. Injury Goals
 - A. No Lost Time Injuries.
 - B. Reduce Medical Cases 50%, to 8.
- II. Continue Attitude Emphasis. Hazard Control Methods directed at sound job planning, teamwork, communication, training and effective followups.
- III. Work Environment
 - A. Review job tasks with high lead exposures, specify work practices, and provide engineering requirement specifications as necessary to reduce exposure.
 - B. Monitor on a routine basis for VCM, Lead, Antimony and Total Dust.
 - C. Conduct monitoring for toxic raw materials, intermediates, and finished products.
 - D. Revise monitoring data card to fit current needs - Complete.
 - E. Monitor performance of ventilation systems.
 - F. Conduct Noise Survey and make recommendations for noise reduction as necessary.
 - G. Improve Catalyst handling in plasticizer operation.
- IV. Build and startup plant expansion without serious loss producing incident.
 - V. Revise and issue Plant Emergency Plan to include required items from new OSHA Fire Protection Standard - Complete.
- VI. Conduct First Aid refresher course for off-shift first aid personnel - Complete.
- VII. Supply Monthly Safety Meeting topics which focus on most important safety topics.
- VIII. Complete field work on Phase II Fire Protection Improvement Project.
- IX. Engineering on Phase III Fire Protection Improvement Project and Project operationg by year end.
- X. Install Lightnin Agitators on D-500 and D-600 reactors.

CHART I

ABERDEEN CHEMICAL PLANT

INJURY PERFORMANCE

INJURY FREQUENCY X 100



$$\text{FREQUENCY} = \frac{\text{Injuries (FA or MC)} \times 12}{\text{Total Employees}}$$

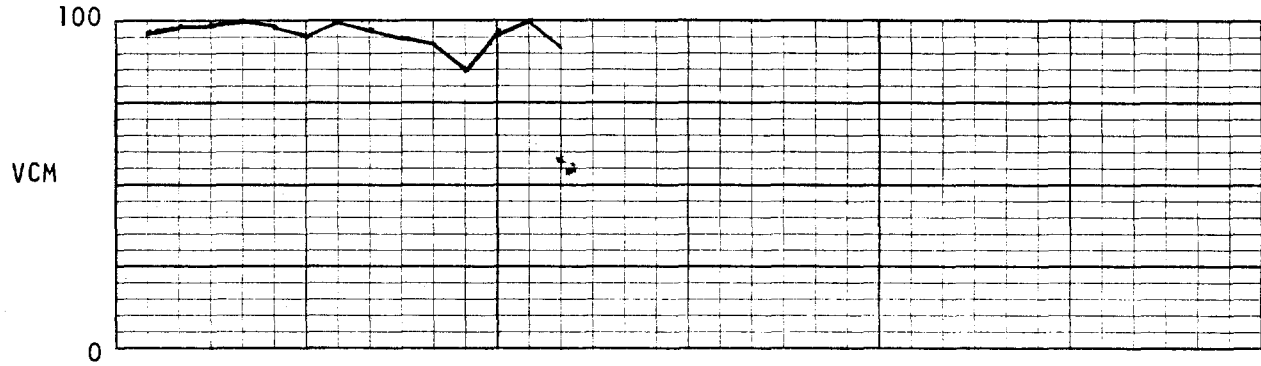
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CHART II

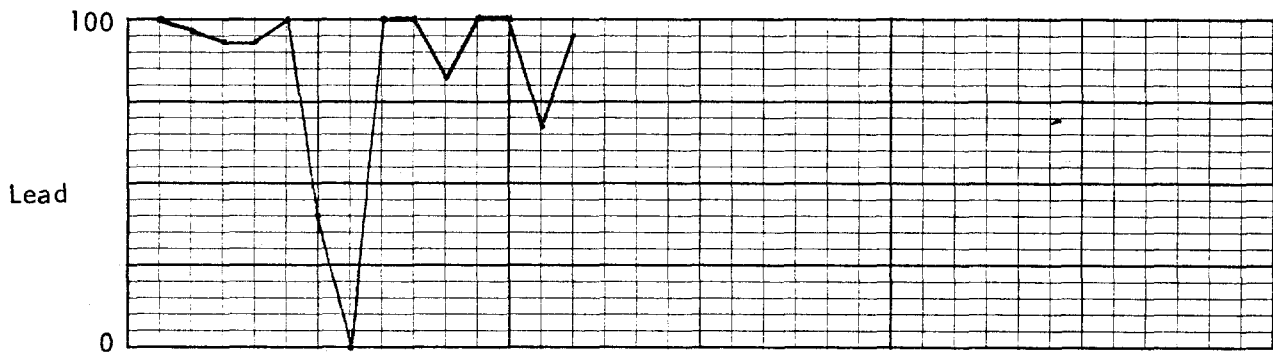
ABERDEEN CHEMICAL PLANT

CHEMICAL DOSIMETRY TRENDS

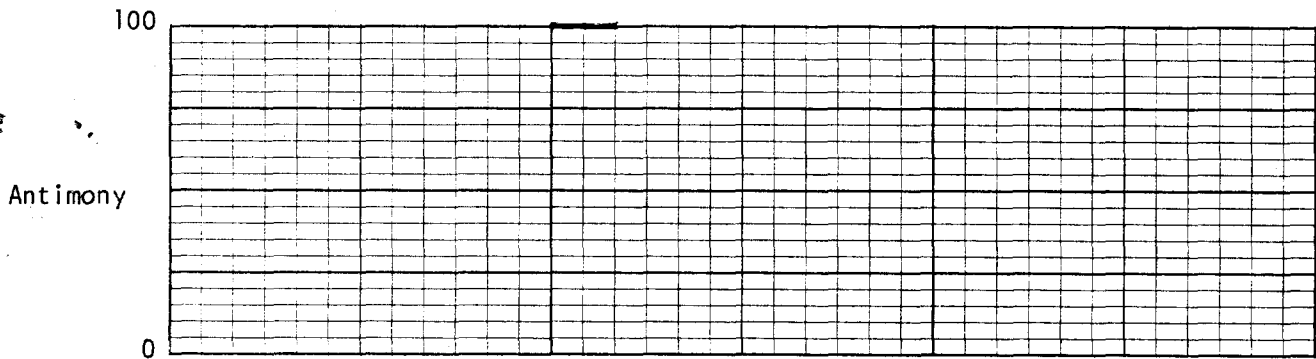
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PEL



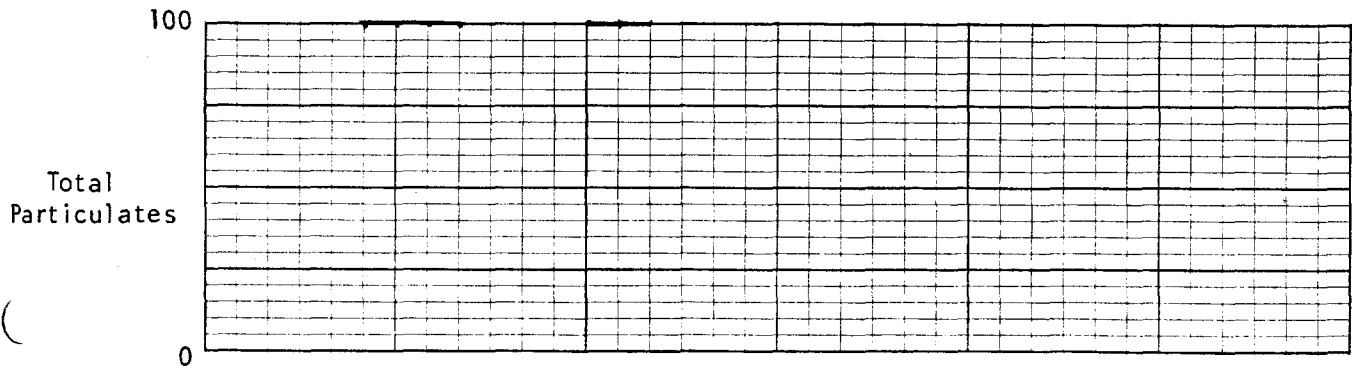
VCM



Lead



Antimony



Total
Particulates

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
19 80												19 81												19 82											

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ABERDEEN PVC RESIN EXPANSION

I. INTRODUCTION

II. PROJECT DESIGN

- A. Large Reactors
- B. Fluid Bed Dryer

III. PROJECT SCHEDULE

- A. Fluid Bed Dryer and Silos
- B. Slurry Blend Tanks
- C. Reactors, Etc.
- D. Targeted Completion
- E. Cost Report

IV. CONSTRUCTION COORDINATION

- A. Safety Training
- B. Contractor Work Permits
- C. Continuous Monitoring
- D. Frequent Communications
- E. Process Tie-Ins

V. STAFFING

- A. Manpower Requirements
- B. Timing
- C. Training

ABERDEEN PVC RESIN EXPANSION

VI. STARTUP

- A. Equipment and Instrument Check-Out
- B. Startup Assistance
- C. Spare Parts

VII. RELATED PLANT PROJECTS

- A. Waste Water Stripper
- B. Waste Water Treatment Revisions
- C. VCM Storage Track
- D. Chem Wash System
- E. Multigrade Resin Facilities

ABERDEEN PVC RESIN EXPANSION SCHEDULE

PROJECT SECTION	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
FLUID BED DRYER AND SILOS												
1. CIVIL .												
2. MECHANICAL												
3. ELECT./INSTR.												
4. PAINT/INSUL.												
SLURRY BLEND												
1. CIVIL												
2. MECHANICAL												
3. ELECT./INSTR.												
4. PAINT/INSUL.												
REACTORS, ETC.												
1. CIVIL												
2. MECHANICAL												
3. ELECT./INSTR.												
4. PAINT/INSUL.												
OVERALL												
1. CIVIL												
2. MECHANICAL												
3. ELECT./INSTR.												
4. PAINT/INSUL.												

RELATED PLANT PROJECTS

WASTE WATER STRIPPER

WASTE WATER TREATMENT REVISIONS

VCM STORAGE TRACK

CHEM WASH SYSTEM

MULTIGRADE RESIN FACILITIES

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PLANT OPERATIONS & COST REDUCTION

I. GENERAL OPERATIONS

- A. 1980 Performance
- B. 1981 Objectives

II. VARIABLE COST REDUCTION PROGRAMS

- A. VCM Efficiency
 - 1. History, Three Year Plan
 - 2. VCM Loss Reduction
 - 3. Reactor Foaming Control
 - 4. Improved Particle Size Control
 - 5. Resin Loss Reduction
 - 6. Accounting Controls
- B. New Additive Development
 - 1. Initiators
 - 2. Chain Transfer Agent
 - 3. Suspending Agents
 - 4. Calcium Stearate
 - 5. Anti-Oxidants

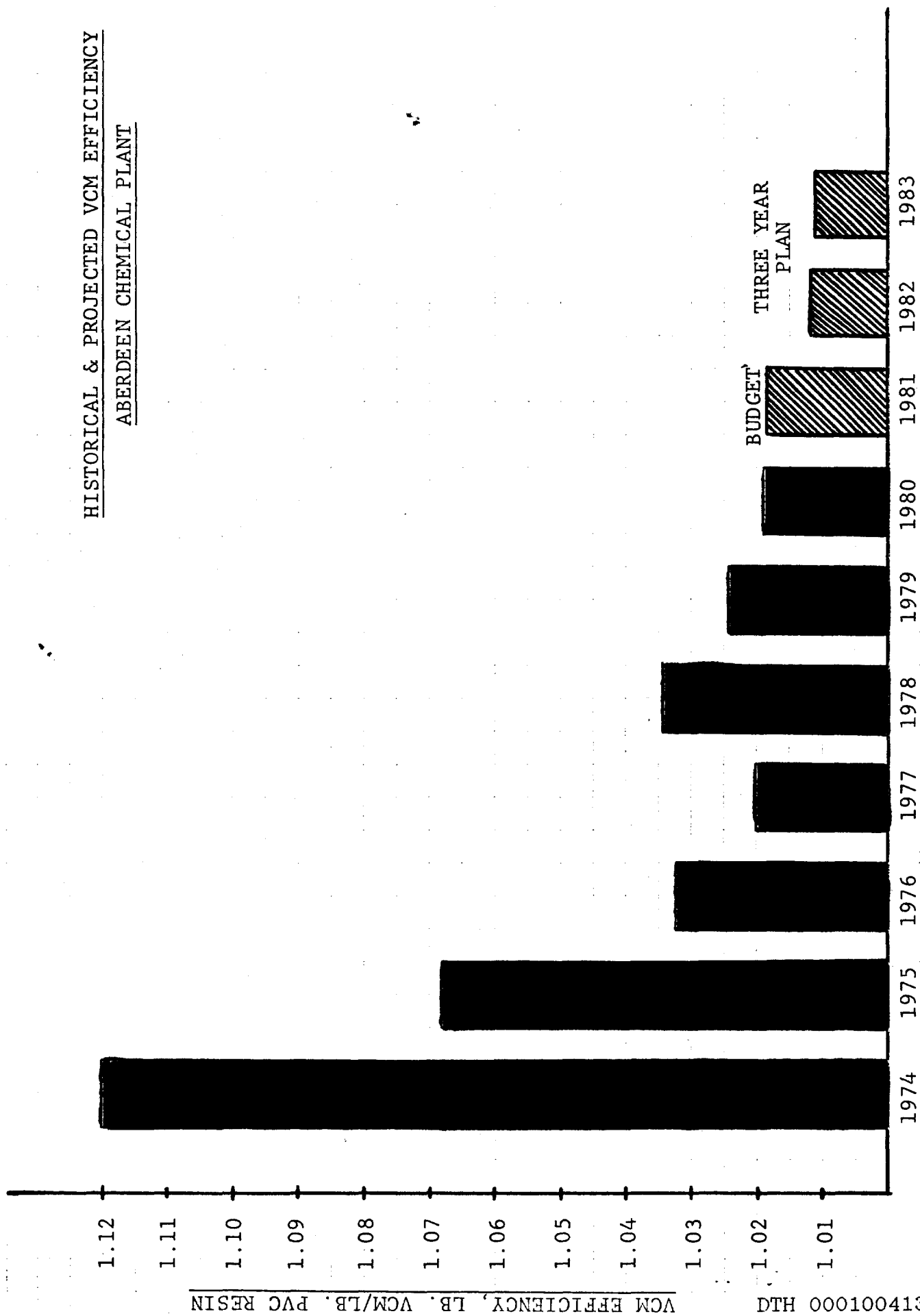
III. SIX MONTH INTERIM COST CONTROL PROGRAM

- A. Sifter Overflow Reclaim & "H" Grade Bag Inventory Reduction
- B. On-Going Pallet and Scrap Metal Recycle
- C. Optimize VCM Railcar Weighing
- D. Optimize In-Plant Railcar Switching

IV. COST SAVING CAPITAL PROJECTS

- A. Sifter Overflow Reclaim System
- B. Automatic Resin Bagger
- C. Vacuum System for Dryer Buildings

HISTORICAL & PROJECTED VCM EFFICIENCY
ABERDEEN CHEMICAL PLANT



VCM EFFICIENCY, LB. VCM/LB. PVC RESIN

814001000 HLD

1980 ABERDEEN COST PERFORMANCE

VARIABLE COST VARIANCE

DUE TO EFFICIENCY \$ 144 M

DUE TO PRICE \$ 677 M

FIXED COST VARIANCE

\$ 837 M

TOTAL \$1.658 M

ABERDEEN PRODUCTION

<u>DEPARTMENT</u>	<u>1980 PRODUCTION</u>		<u>% OF BUDGET</u>	<u>1981 PRODUCTION OBJECTIVES</u>	
	<u>BUDGET (MM LBS.)</u>	<u>ACTUAL (MM LBS.)</u>		<u>(MM LBS.)</u>	
VINYL	335	274.5	82%	346	
COMPOUND	60	47.5	79%	55	
DRY BLEND	32.6	25.9	81%	42	
PLASTICIZER	25.0	10.0	40%	13	

NEW ADDITIVE DEVELOPMENT

INITIATORS

- DUAL INITIATORS
- HIGHER PRODUCTIVITY INITIATORS
 - LUCIDOL L-46
 - WITCO 545 M

CHAIN TRANSFER AGENT

- BENEFITS OF LOWER OPERATING PRESSURES
- PROVIDES POTENTIAL TO PRODUCE 0.68 VISCOSITY RESIN

SUSPENDING AGENTS

- ALTERNATE SOURCE DEVELOPMENT (HENKEL?)
- POTENTIAL FOR IMPROVED PARTICLE SIZE DISTRIBUTION

CALCIUM STEARATE

- ALTERNATE SOURCE DEVELOPMENT

ANTI-OXIDANTS

- CONTINUING SEARCH FOR NEW ANTI-OXIDANTS FOR IMPROVED
HEAT STABILITY

PROFIT IMPROVEMENT

I. ENERGY

A. Steam

1. Boiler Operation
 - a. Low Production Periods
 - b. Natural Gas
 - c. Corrective Feedback
2. Optimize Steam Use
 - a. Steam Stripping
 - b. PVC Conversion
 - c. Rinse Water
 - d. Steam Injection
3. Steam Traps
4. Leak Survey and Repairs

B. Air

1. Shutdown Air Compressors as Feasible
2. Evaluate How to Extend the Life of Reciprocating Compressors
3. Evaluate Large Air Users For Possible Replacement

C. Electrical

1. Replace Oversize Motors
2. Utilize Energy Efficient Motors
3. Ensure High Power Factor

D. Projects

1. Boiler Economizers
2. Centrate Heat Recovery
3. Dryer Insulation
4. Cooling Tower Fan Controls
5. Dual Speed Agitator Motors

PROFIT IMPROVEMENT

II. PLANT STREAM FACTOR IMPROVEMENTS

A. Equipment Operation*

1. Curtail Equipment Operation as Possible
2. Improve Equipment Reliability

B. Control Overtime in All Areas

1. Operations
2. Maintenance
3. Laboratory

C. Improve Productivity

1. Work Sampling
2. Supervisory Involvement
3. Training in All Areas
4. Improved Scheduling

D. Critical Spares

1. Storeroom Parts Review

III. WAREHOUSE, RAW MATERIALS, SERVICES

A. Review of Inventory Levels

B. Competitive Pricing

1. High Volume Storeroom Items
2. Discounts
3. Capital Materials

C. Monthly Variance

1. Defer Projects
2. Evaluate Unbudgeted Items
3. Control Operating Supplies

PROFIT IMPROVEMENT

III. WAREHOUSE, RAW MATERIALS, SERVICES - (continued)

1. Bell System Teleprinters
2. Warehouse Stock to Replacement Value

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CURRENT ENVIRONMENTAL PROJECTS

VCM CONTAINMENT

PROJECT	AFE DATE	EXPECTED COMPLETION	CAPITAL COST, \$M
WATER STRIPPING ✓	4/80	6/81	810
SPARE INCINERATOR	1/80	8/81	650
REACTOR PRESSURE RELIEF MODIFICATIONS ✓	11/80	10/81	560
EMERGENCY AMS KILL SYSTEM	11/80	9/81	325
FIXED POINT MONITOR DATA COMPUTER & WARNING LIGHTS	4/80	9/81	113
BREATHING AIR MODIFICATIONS	9/80	5/81	21
EMERGENCY COOLING FOR REACTORS	5/81*	8/82	400
REACTOR HIGH LEVEL ALARMS	10/81*	3/82	26
RVCM RECEIVER HIGH LEVEL ALARMS	4/81*	9/81	16
IMPROVED RUPTURE DISK HOLDERS ✓	4/81*	12/81	27
STEAM STRIPPING INSTRUMENTATION	4/81*	12/81	25

WATER-NPDES PERMITTING

WASTE WATER TREATMENT REVISIONS	6/81*	3/83	560
PLASTICIZER SPILL CONTAINMENT	4/81*	6/82	50
PLASTICIZER IRRITANT CONTROL	12/80	9/81	80

RCRA-HAZARDOUS WASTE

RESIN RECLAIM SYSTEM	12/80	1/82	727
CAPABILITY TO RECEIVE OKC POND RESIN	6/81*	1/82	105
GROUNDWATER MONITORING	3/81*	11/81	30

* 1981 BUDGET

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KEY 1980 ACCOMPLISHMENTS

1. Positive Overall Plant Efficiency Variance of \$144 M.
2. Positive Overall Plant Fixed Cost Variance of \$837 M.
3. Record High Vinyl Efficiency of 98.1%.
4. Maintenance Productivity Increased 8.7% to 61%.
5. Maintenance Overtime 5.1%.
6. Major problem with Capacity Replacement Reactor Vibration was solved.
7. Completed 1 year without a lost time injury.
8. Although medical cases increased, safety improvements were started in 1980 leading to a record 197 days without an injury requiring medical attention in 1981.
9. Reduced Quality Complaints 25% in a reduced sales year when customers are most sensitive to quality.
10. Conducted additional agitation studies and modified PVC Reactor Agitators and Methocel Addition for major improvement in particle size.
11. Conducted several test runs of alternate initiators, calcium stearates, suspending agents and chain transfer agents.
12. Developed and Commercialized method to lower 5305 operating pressure 20 PSIG thereby decreasing potential for relief valve discharges.
13. New 2 Year Contract with U. S. Steelworkers of America Union.
14. Testing and Commercialization of Low Cost Single Screw Dry Blend.
15. Produced Developmental Quantities of RP-100 Profile Dry Blend.
16. Decreased Reactor Gearbox Failures from 19 to 6 and Reactor Seal Failures from 36 to 20.
17. Reduced manhours spent on "E" Work Orders from 29 to 14.9% of total maintenance hours.
18. Scheduled reactor and dryer areas for maximum utilization of inventory control time to do major maintenance, conduct test runs and minimize overtime.
19. Improved standards for new hourly employee selection and increased probationary period to 120 days.

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To

Date

① Safety

- a) 1981 actuals 1982 goals
- b) Emphasis on employee participation - Dec. mty, ES&L's, our response.
- c) Contractor program.
- d) ~~Lead~~ Exposure abatement - lead levels in blood.
- e) Item (a) of special exposure in 1982.

② Energy ~~Conservation~~

③ PVC Expansion & 1981 Operations

1981 target = \$1.139mm } profit
 1981 results = \$2.270mm } exp. program

④ Cost Control & Cash Flow Improvement

- a) 1981 operating rates & costs. 1982 operating rates & budgeted costs
- b) Cost control/reduction programs. Cash flow improvement.
- c) Inventory control programs & 1981 results

⑤ Environmental Highlights

EPA, RCRA, state, permits, projects, etc.

⑥ RP-100 & Experimental Dry Blends - status report & plans.

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PROFIT IMPROVEMENT AND COST CONTROL

• PERFORMANCE HISTORY AND GOALS

• 1981 GOALS

- PVC VARIABLE COST
- H-GRADE RESIN →
- SIFTER OVERFLOW AND SWECS
- 5425 FOR 18031 COMPOUND
- ~~VAC WEIGHTING AND SWECS~~
- UTILITY COSTS
- COMPOUND STREAM FACTOR
- • PLANT FIXED COSTS

1981 operating ratios
+ cost

1982 budget w/
ratios + work

• 1982 GOALS (SIX MONTHS)

- PAYROLL AND BENEFITS
- MAINTENANCE AND CONTRACT COSTS
- ANTIOXIDANTS FOR PVC
- H-GRADE RESIN
- CAPITAL PROJECT DELAYS

• PLANT STREAM FACTOR

• EQUIPMENT OPERATION

- RELIABILITY
- CURTAILMENT

• OVERTIME CONTROL

- OPERATIONS
- MAINTENANCE
- LABORATORY

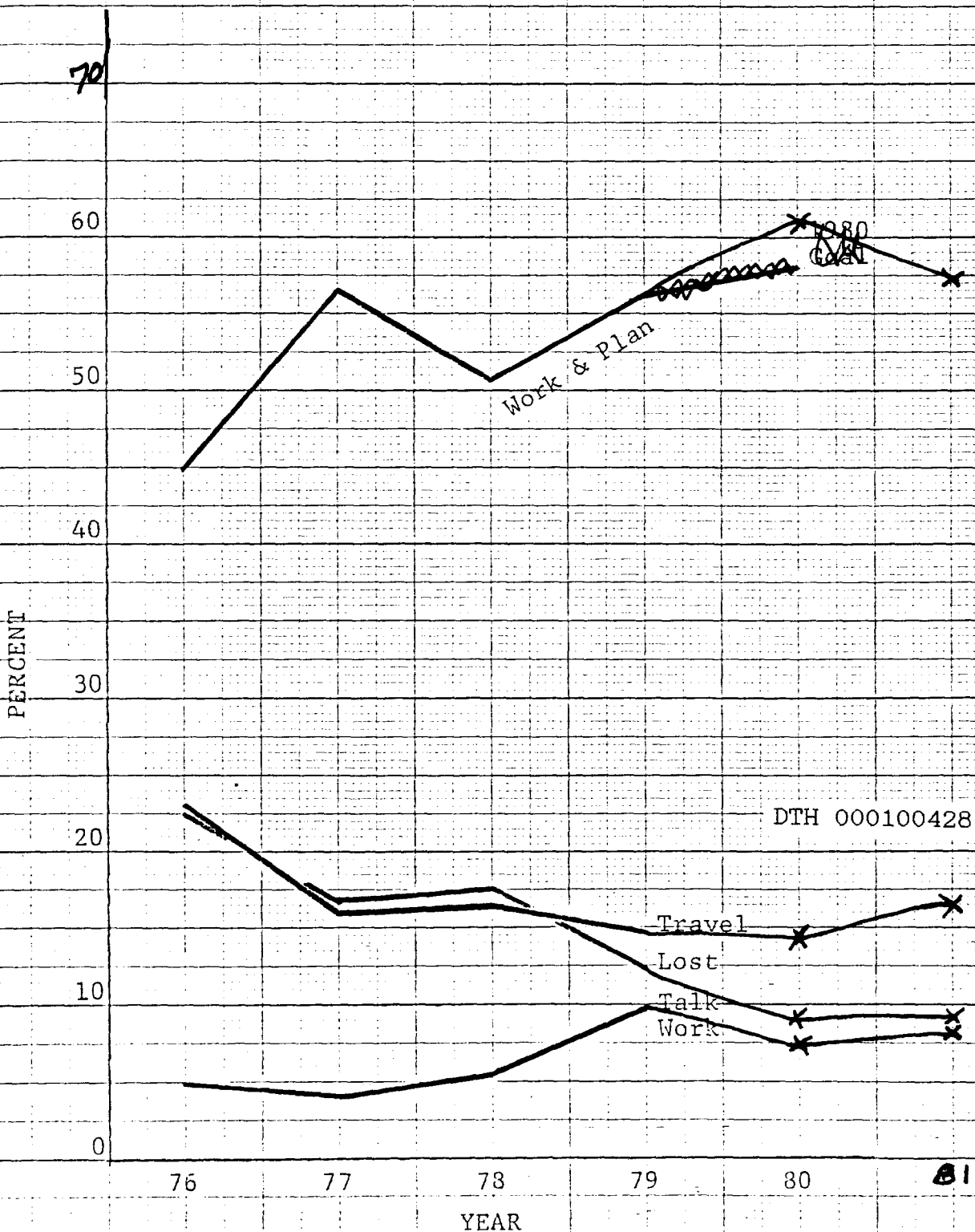
- PRODUCTIVITY
 - MAINTENANCE
 - OPERATIONS
 - CAPITAL PROJECT WORK

- WAREHOUSE , RAW MATERIALS, SERVICES
 - INVENTORIES
 - PRICE COMPETITION
 - VARIANCE ANALYSIS
 - SURPLUS EQUIPMENT
 - ~~1981 ROAD BOUL~~

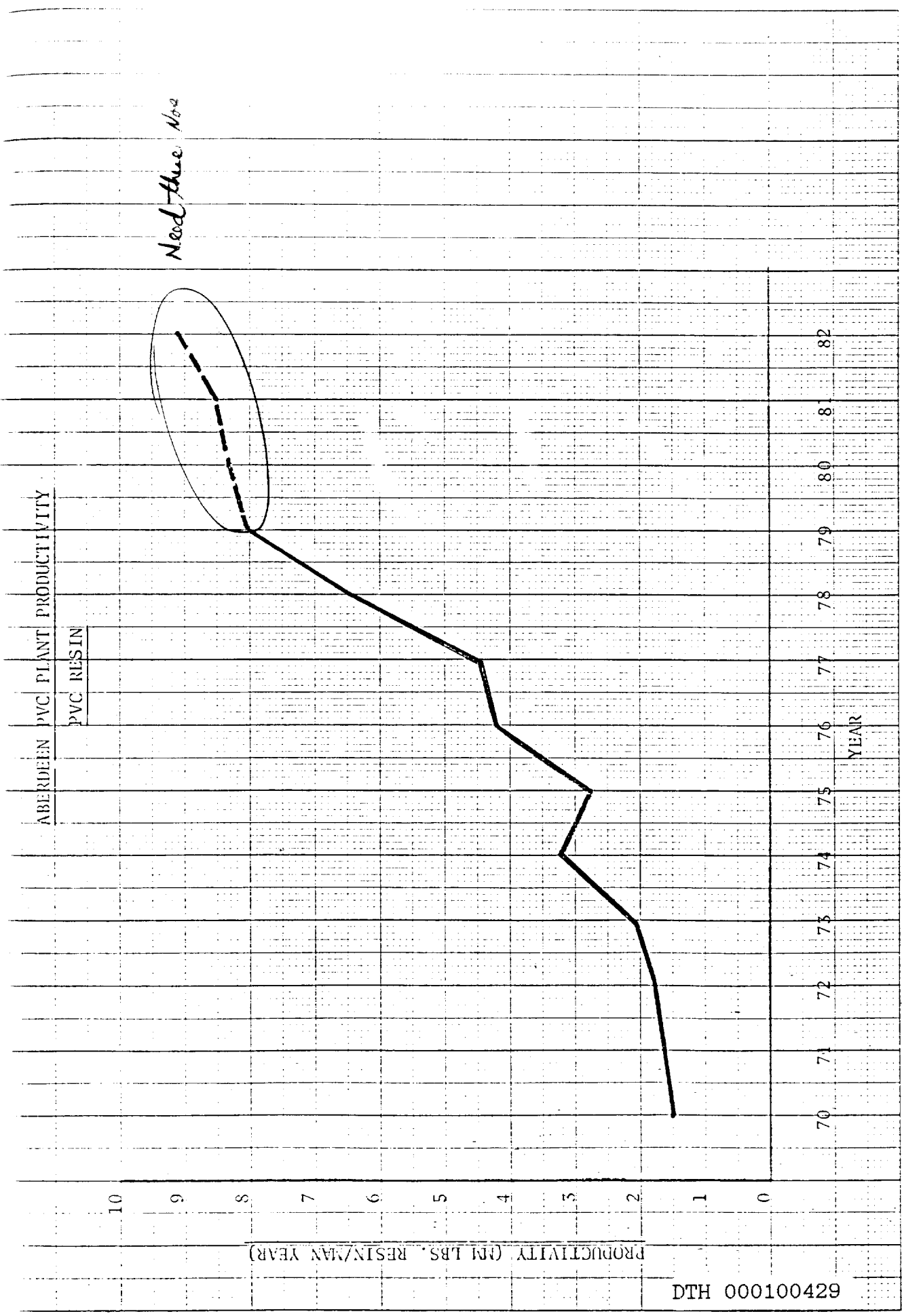
- COST SAVING CAPITAL PROJECTS
 - SIFTER OVERFLOW RECLAIM RESIN

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ABERDEEN PVC PLANT MAINTENANCE WORK SAMPLING



45	56	51	56	61	57
23	16	16	14	14	16
22	17	17	12	9	9
5	4	6	10	7	8



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SPECIAL ITEMS

WORK PRACTICES

ANALYSIS

ABERDEEN PVC PLANT PRODUCTIVITY
TOTAL PLANT

Need these also.

1980
Goal

PRODUCTIVITY (MM LBS. TOTAL PRODUCT/MAN YEAR)

YEAR

1. Hose Operation Not Included

71 72 73 74 75 76 77 78 79 80 81

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SPECIAL ITEMS

WORK PRACTICES

APPROACHES