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ABERDEEN PVC PLANT
GENERAL REVIEW

February 20, 1980

SAL 000109040

AGENDA

9:30 a.m.....Plant Tour

10:30 a.m.....Environmental Health.....Jim Hall
Toxic Exposure &
Industrial Hygiene

10:40 a.m.....Safety & Chemical Exposure.....Allen Sather

Production - Vinyl.....Charles Miller

Production - Other.....Jimmy McCrimon

Cost Control.....Steve Vincent

Energy Management.....Dick Frohreich

Efficiency Improvement.....Charles Miller
Program

Productivity.....Curry Miller

Absenteeism Overtime &.....Jim Carter
Restrictive Work Practices

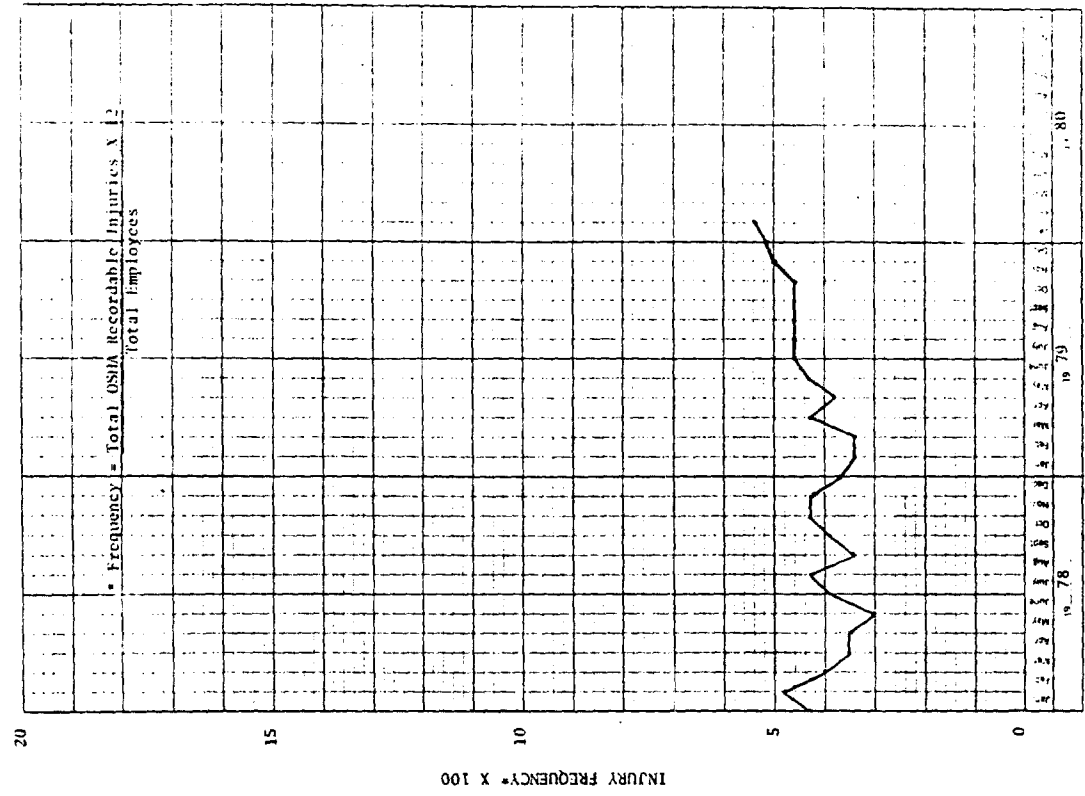
Special Items.....Randell Jackson
Dick Frohreich
Charles Miller

12:30 p.m.....Lunch

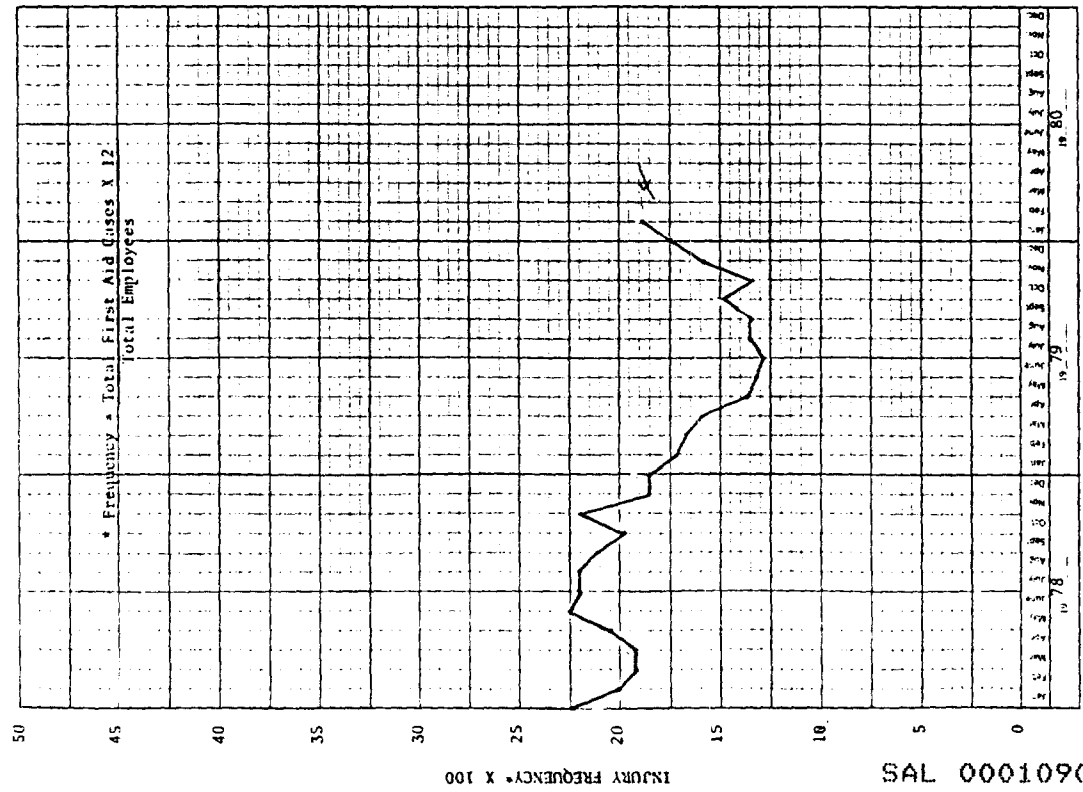
1:30 p.m.....Executive Presentation.....R. W. Gerwig

2:30 p.m.....Depart for Airport

ABERDEEN OSIA RECORDABLE INJURIES
12 MONTH MOVING AVERAGE



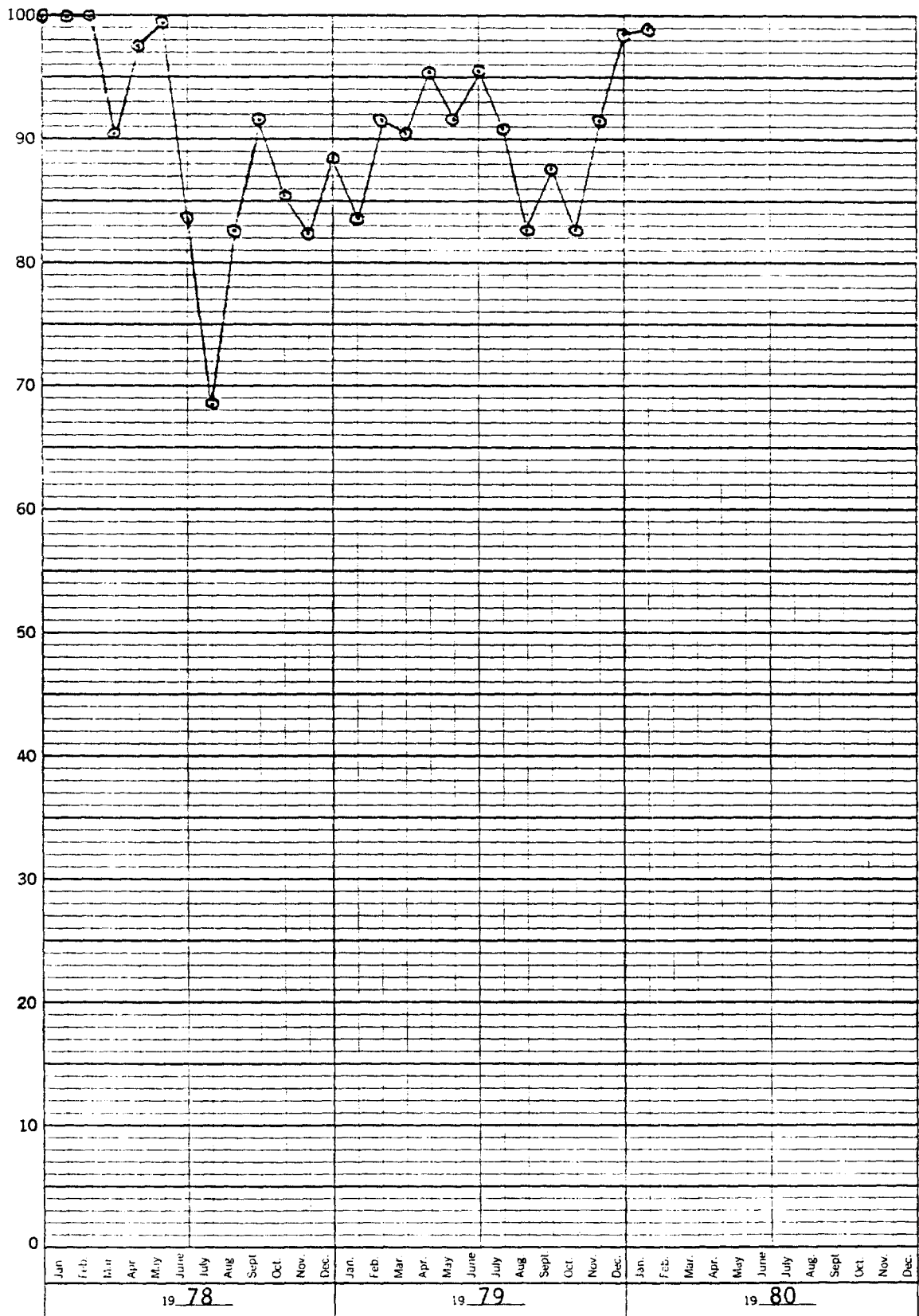
ABERDEEN FIRST-AID CASES
12 MONTHS MOVING AVERAGE



VCM DOSIMETRY TREND, BELOW 1 PPM

-ABERDEEN-

PERCENT OF TOTAL SAMPLES LESS THAN 1.0 PPM



SAL 000109043

CHEMICAL EXPOSURE ABATEMENT

1979 LEAD SAMPLING

(µg/M³)

Job Classification	Initial Results			3rd & 4th Quarter	
	Before Range	Average	After Range	Average	Range
Compounder - Compound					
Line I	9.3-15.7	11.5	49.6	49.6	-
Line III	8.6-402.4	101.4	18.2-34.5	23.2	-
Combined	-	-	-	-	2.5-60.4
Color Weigh Room	28.1-387	220.8	-	-	2.6-850
					372
Mill Operators - Compound					
Line I	11.9	11.9	31.5	31.5	-
Line III	7.7-151.3	55.1	6.1-11.2	7.7	-
Combined	-	-	-	-	4.6-18.3
					10.2
Supervisor - Compound	6.7-9.6	8.2	7.1	7.1	3.3-7.6
					5.3
Utility - Compound	27.5	27.5	15.8	15.8	2.7-53.3
					12.1

Permissible Exposure Limit (PEL) - 50 µg Pb/M³, Action Level - 30 µg Pb/M³

- NOTES: (1) All remaining job classifications in the Compound Department less than action level.
 (2) All Laboratory job classifications far less than the action level.

1979 PLANT SAFETY ACCOMPLISHMENTS

RIGGING TRAINING PROGRAM

- Films - April
- Crane Inspection and Certification Bureau

MONTHLY SAFETY MEETINGS

EMPLOYEE SAFETY ACTION REQUEST (ESAR)

PLANT SAFETY AUDIT BY SAFETY DEPARTMENT

- Physical Hazards
- Lighting
- Noise

SAFETY PROCEDURES FOR CLEARING PLUGGED LINES

OSHA SAFETY INSPECTION

SUPERVISOR'S SAFETY WORKSHOP - SAFETY AWARENESS

- Accident and Injury Control Procedure
- Film Review

EMPLOYEE SAFETY RESPONSIBILITIES PROGRAM

NEW COMPOUND LINE

- Pre-Startup Safety Reviews
- Operating Manual/Training

JOB SAFETY ANALYSIS (32)

CHEMICAL EXPOSURE

LEAD

- Initial Sampling and Analysis
- Changes and Follow-Up Monitoring
- Color Weigh Room

VCM

- Routine Monitoring Program
- OSHA Industrial Hygiene Inspection

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1980 PLANT SAFETY PLANS

PEOPLE EMPHASIS

"WIN WITH SAFETY" CAMPAIGN

- Sports Themes with Focus Topics
- Monthly Safety Meeting Emphasis with Film Support
- Posters

TRAINING

- Job Safety Analysis
- Standard Operating Procedures
- Home Study Course - Department Heads
- Employee Safety Responsibilities Program
- Hourly Involvement
- Fire Watch Training

SAFETY COMMITTEE

PLANT SAFETY AUDIT BY DEPARTMENTAL AND SAFETY PERSONNEL

- Physical Hazards
- Noise
- Lighting

STUDY OF BAGGING OPERATION

ONGOING PROGRAMS

CHEMICAL EXPOSURE

- Statement of 1980 Program
- Update Files
- Review Regulations
- Recheck Exposures
- Review VCM and Lead Data to Redefine Monitoring Requirements

VINYL DEPARTMENT

1979 PERFORMANCE

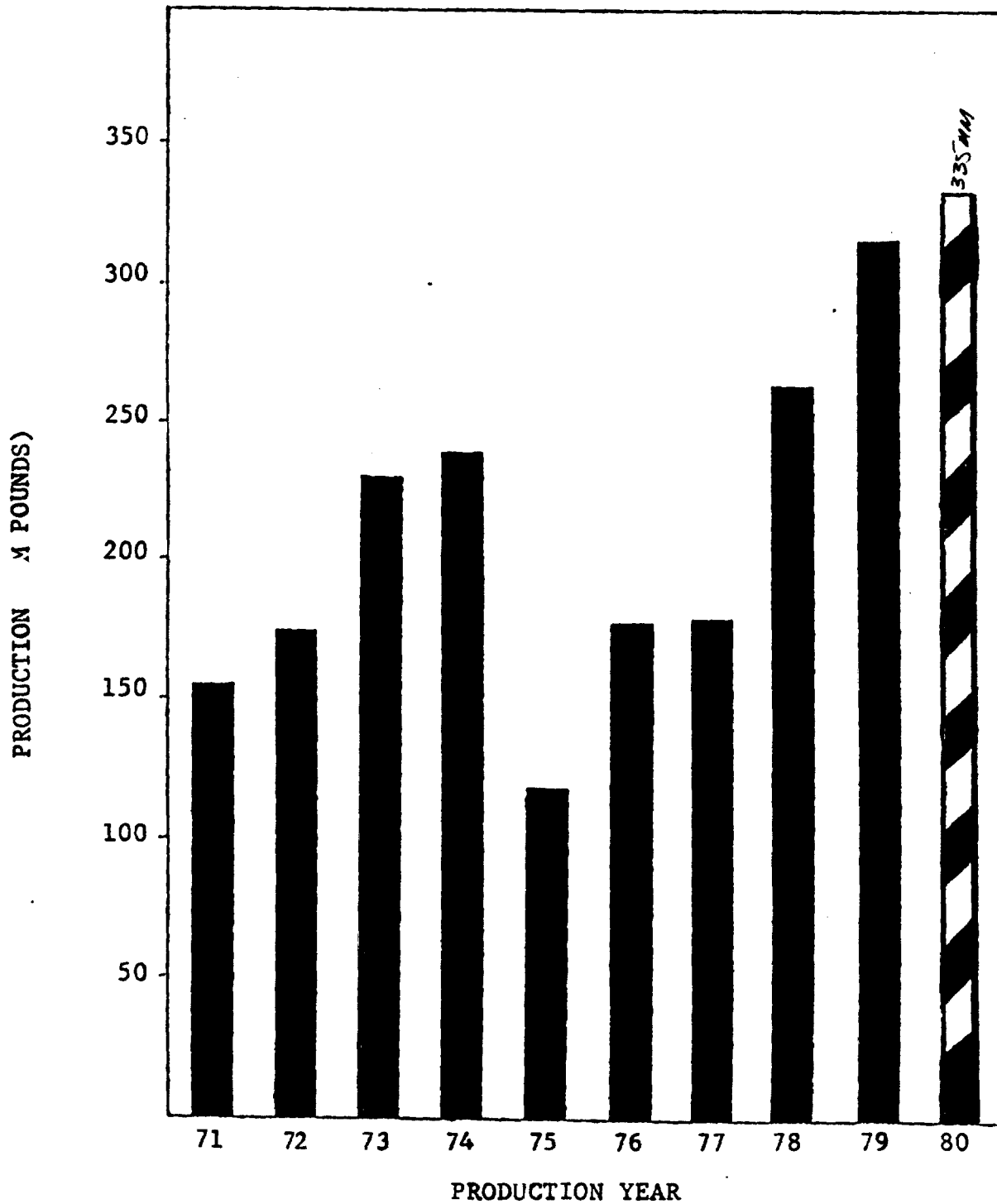
<u>Production</u>		<u>Efficiency</u>	
Budget (MM Lbs.)	Actual (MM Lbs.)	Budget (# s/#)	Actual (# s/#)
330.0	318.0	1.01960	1.02414

1980 OBJECTIVES

<u>Production</u>		<u>Efficiency</u>	
Budget (MM Lbs.)	Forecast (MM Lbs.)	Budget (# s/#)	Forecast (# s/#)
335.0	335.0	1.01960	1.01960

VINYL PRODUCTION SUMMARY

1971 - 1979



SAL 000109048

COMPOUND DEPARTMENT

1979 PERFORMANCE

<u>Department</u>	<u>Production</u>		<u>Efficiency</u>		<u>(\$M)</u> Departmental Efficiency Variance	<u>Quality</u> "H" Grade	
	<u>Budget</u> (MM Lbs.)	<u>Actual</u> (MM Lbs.)	<u>Budget</u> (Lbs./Lb.)	<u>Actual</u> (Lbs./Lb.)		<u>Budget</u> (%)	<u>Actual</u> (%)
Compound	58.0	44.3	1.01298	1.01154	204	2.2	1.95
Dry Blend	57.0	50.1	1.00324	1.00468	(200)	-	-
Plasticizer	22.1	11.5	1.10778	1.14706	(63)	-	-

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PVC COMPOUND OPERATIONS

PRODUCTION SUMMARY

<u>Department</u>	<u>1977 Actual (MM Lbs.)</u>	<u>1978 Actual (MM Lbs.)</u>	<u>1979 Actual (MM Lbs.)</u>	<u>1980 Budget (MM Lbs.)</u>
Compound	30.1	40.7	44.3	60.0
Dry Blend	42.1	59.8	50.1	32.6
Plasticizer	8.9	10.4	11.5	25.0

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1980 OPERATING DEPARTMENT OBJECTIVES

<u>Department</u>	<u>Production</u>		<u>Efficiency</u>	
	<u>Budget</u> <u>(MM Lbs.)</u>	<u>Forecast</u> <u>(MM Lbs.)</u>	<u>Budget</u> <u>(Lbs./Lb.)</u>	<u>Forecast</u> <u>(Lbs./Lb.)</u>
Compound	60.0	58.6	1.01299	1.01299
Dry Blend	32.6	27.8	1.00318	1.00318
Plasticizer	25.0	15.1	1.09087	1.09087

A. PRODUCTION OBJECTIVES RATIONALE

The 1980 production objectives are based on projected product mix as supplied by the Business Area for the 1980 Fixed and Variable Cost Budget. Compound production will be obtained by 7 day/week operation of two compound lines, and Dry Blend production will be achieved by a 5 day/week, 2 shift/day operation.

B. EFFICIENCY OBJECTIVES RATIONALE

The efficiency objective is based on the budgeted product mix.

SAL 000109051

COMPOUND LINE V STATUS

Compound Line V is currently operating 12 hours per day, 5 days per week with Line I operating the remainder of the 5 day per week schedule. This allows Line I to replenish the packaged compound inventory while at the same time allowing work to proceed on Line V operating problems. The following is a summary of major problems which have hindered Line V production:

I. Intensive Mixing Equipment

- A. Mixing Cycle Alterations
- B. Raw Material Piping and Valve Revisions
- C. Bearing Lubrication Revisions

II. Orbitran Process Controller

- A. Rewiring Electrical Interface Between Field and Panel
- B. Modifications to Load Cell Installation
- C. Reprogramming of Microprocessor for Automatic Sequencing
- D. Modifications to Control Panel for Heat Removal
- E. Rewiring of Foxboro Spec 200 Instruments

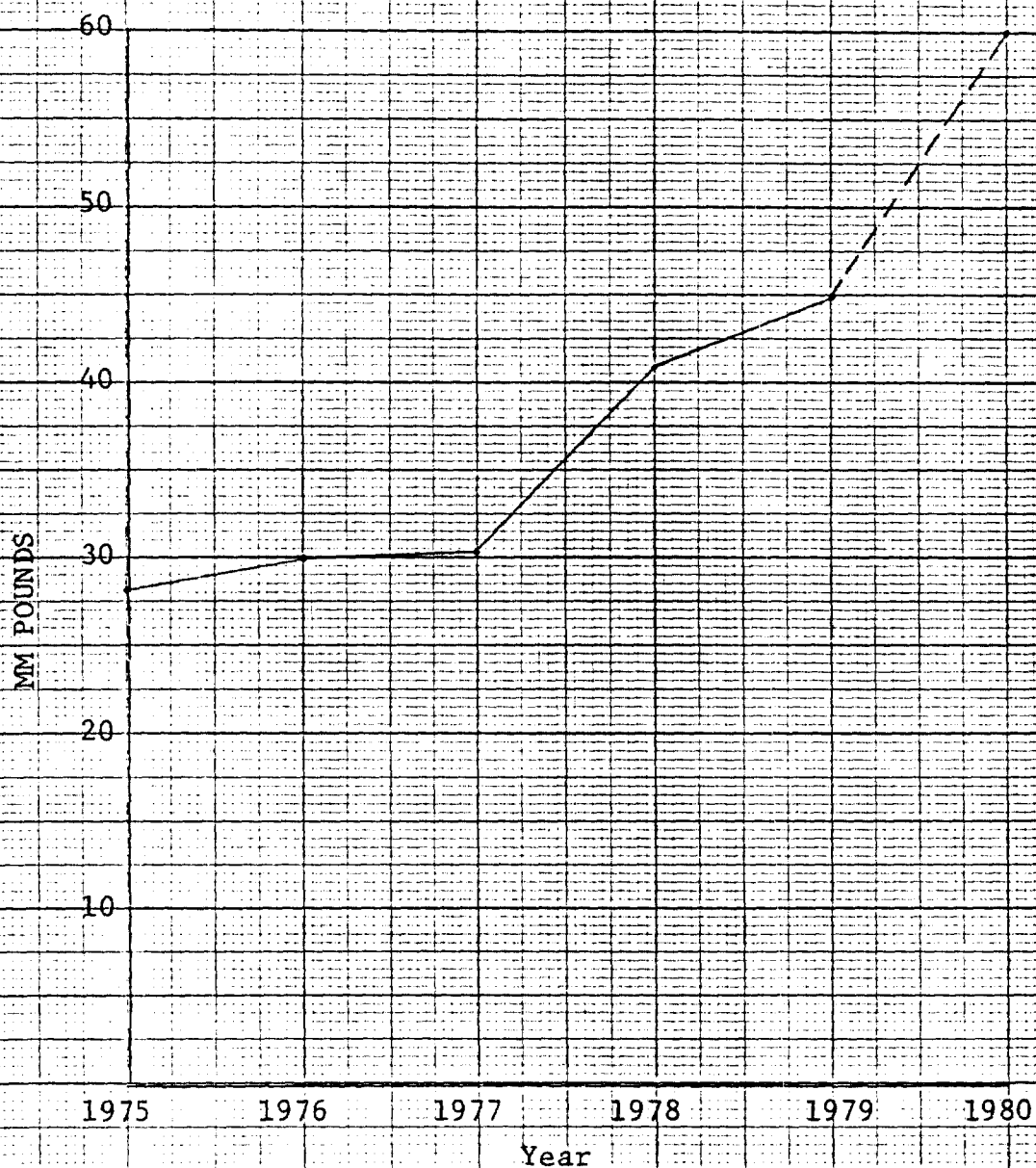
III. Werner-Pfleiderer Equipment

- A. Pellet Transfer System Plugging
- B. Screw Configuration Changes (18 Configurations Tested to Date)
- C. Compound Quality
 - 1. Melt Flow
 - 2. Hard Particles
 - 3. Gels
 - 4. Color (White Compounds Only)

Of the eleven problem areas listed above, all but three have been solved: pellet transfer system plugging, screw configuration changes and quality control of hard particles. Work is continuing on these areas with the assistance of Werner-Pfleiderer and PAL personnel.

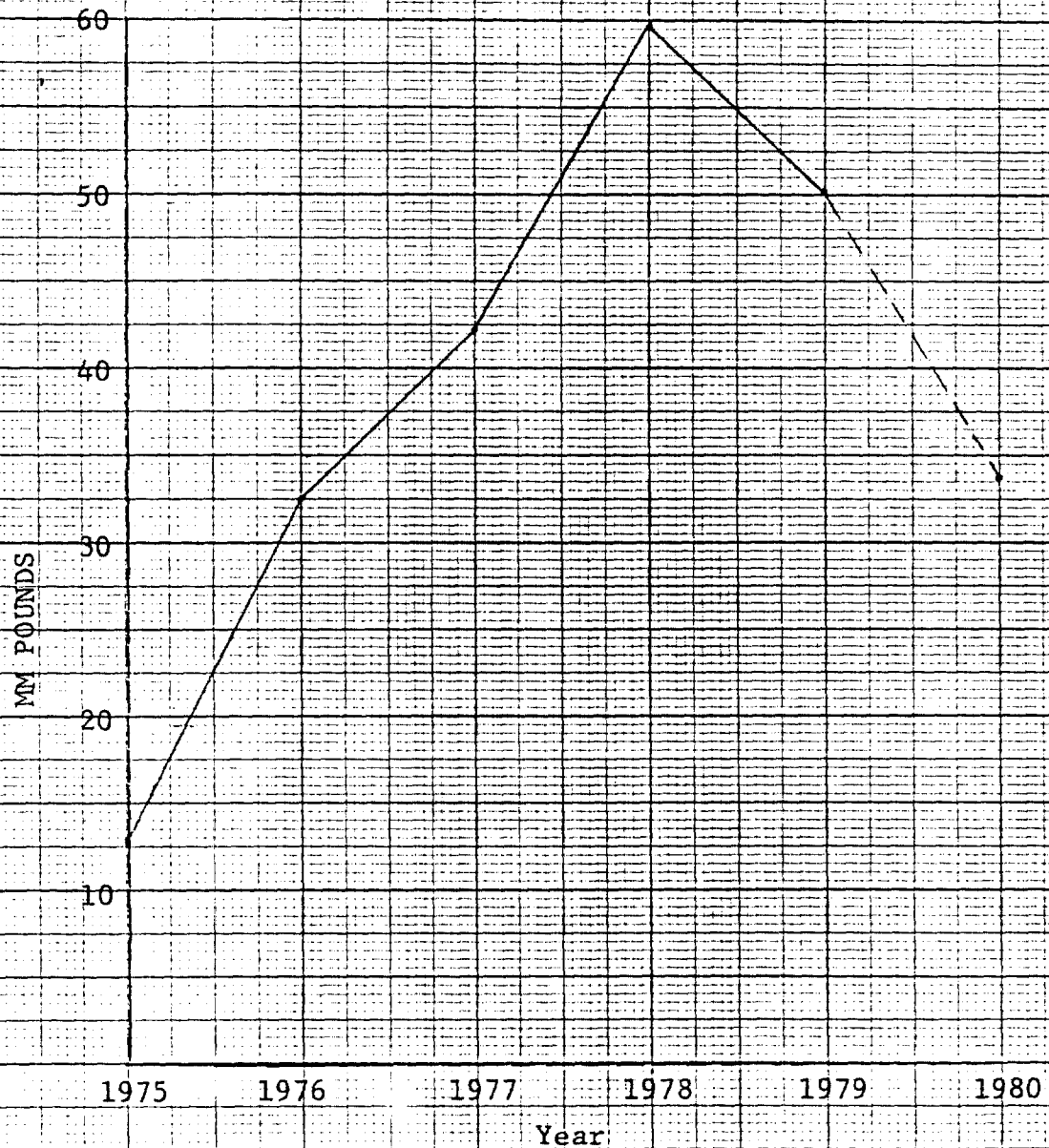
To date three Line V produced compounds have been evaluated by customers. Two of these evaluations were successful while the third test resulted in a rough surface on fence wire which is due to hard particles. The major emphasis is now being concentrated on solving the hard particle problem. Once this is accomplished, the remainder of the sample compounds can be produced and shipped to customers for evaluation.

FLEXIBLE COMPOUND
PRODUCTION SUMMARY
ABERDEEN PVC PLANT



SAL 000109053

DRY BLEND
PRODUCTION SUMMARY
ABERDEEN PVC PLANT



PLASTICIZER
PRODUCTION SUMMARY
ABERDEEN PVC PLANT

25

20

MM POUNDS

15

10

5

1977

1978

1979

1980

Year

SAL 000109055

COST CONTROL

A. MAJOR COST ITEMS COMPARISON

	M\$		
	<u>1979</u> <u>Budget</u>	<u>1979</u> <u>Actual</u>	<u>1980</u> <u>Budget</u>
1. VCM Raw Material	49,280	56,414	69,478
2. Operating Payroll	2,039	2,060	2,174
3. Salaried Payroll	1,549	1,584	1,800
4. Electricity	1,611	1,593	2,025
5. Natural Gas	1,385	1,552	1,861
6. Dry Blend Stabilizers	1,370	1,598	1,336
7. PVC Initiators	1,244	1,120	1,475
8. Capital Expenditures	3,035	2,719	211,102
9. Downtime of PVC Operation	Approximately 90 Per Day		

B. CAPITAL AFE'S

<u>Completion</u> <u>Date</u>	<u>Title</u>	<u>Invest</u>	<u>First Year</u> <u>Savings</u>
5/79	Charge Water Heating Improvements	\$ 35 M	\$ 21.6 M
6/79	Boiler Burner Replacement	170 M	17.1 M
1/80	Centrifugal Air Compressor	340 M	185.4 M
7/80	Methocel Charge Revisions	66 M	24.0 M
10/80	Boiler Economizers	120 M	49.7 M
11/80	Methocel Analyzers	35 M	60.1 M
3/81	Centrate Rinse Water System	300 M	137.4 M
11/81	Compound Die Face Pelletizer	1200 M	428.3 M

C. IMPROVED COST CONTROLS BY DEPARTMENTS

1. Administrative Services

- a. Purchasing Competition
- b. Pallets and Scrap Metals
- c. Storeroom Procedures and Controls
- d. Stock Reduction and Obsolete Items

2. General Plant

- a. Reduce Accidents to People and Equipment
- b. Reduce Process Spills and Leaks
- c. Energy Savings

3. Mechanical (With Utilities)

- a. Continue Bulk Chemical Purchases
- b. Increase Cooling Tower Cycles
- c. Scheduling and Call-In Justification (Overtime Control)
- d. Reduce Emergency Work Orders
- e. Repetitive Failures Solved
- f. Improved Productivity

4. Dry Blend and Compound

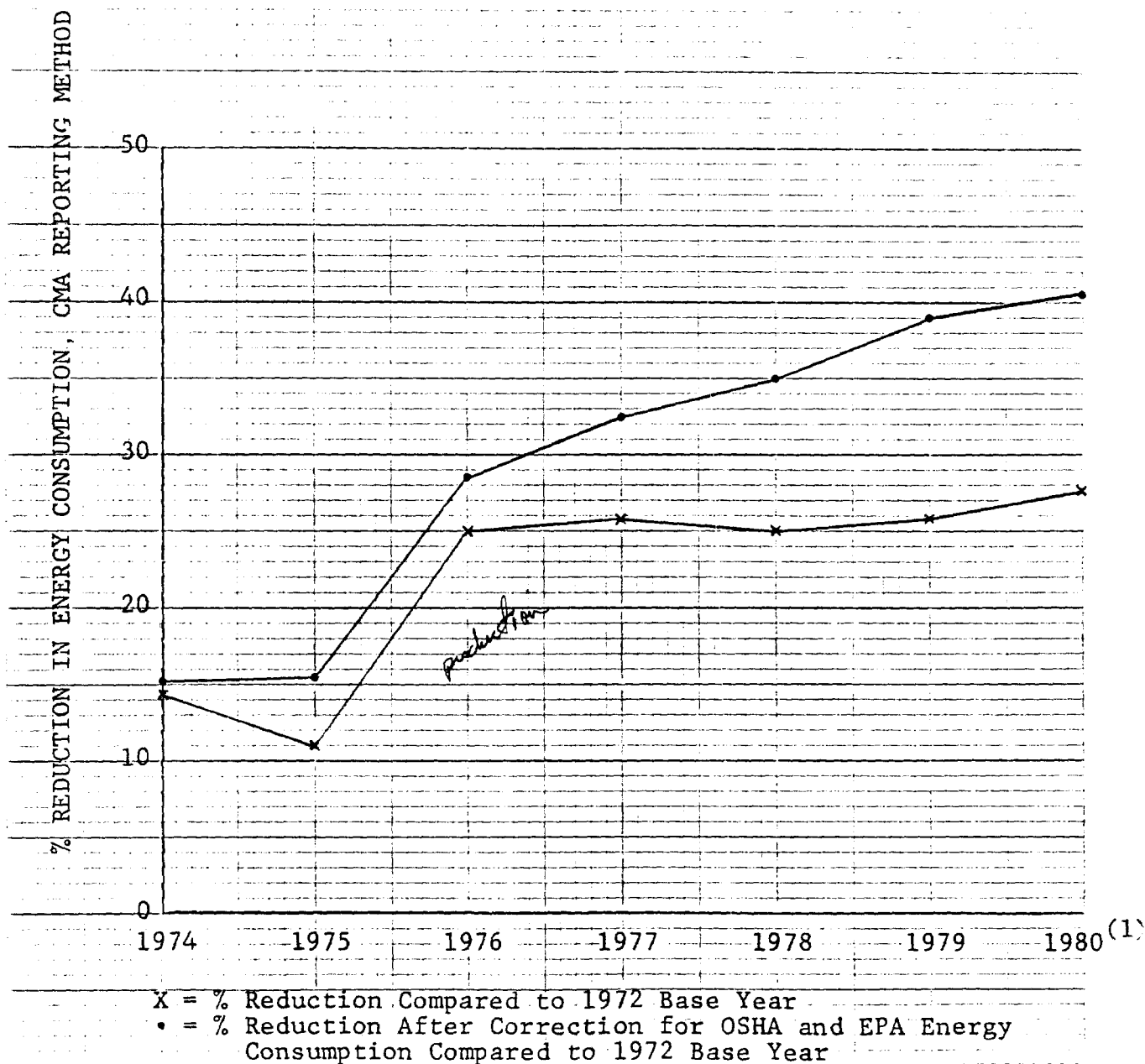
- a. Minimize Use of Materials
- b. Quality Controls

5. Vinyl Reactors and Dryers

- a. Stream Factor Improvements
- b. Vinyl Efficiency (PVC and VCM Loss Controls)
- c. Minimize Use of Materials

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ENERGY PERFORMANCE
CMA REPORTING METHOD
ABERDEEN PVC PLANT



(1) Projected Performance

SAL 000109058

ITEMS AFFECTING ENERGY PERFORMANCE

ABERDEEN PVC PLANT

1980 Budget - 27.8% reduction in energy usage compared to the
1972 Base Year by the CMA Reporting Method.

<u>RECENT IMPROVEMENTS</u>	<u>Energy Savings MMM BTU/Yr.</u>	<u>Effect On Energy Reduction %</u>
Boiler Burner Replacement	12.2	0.6
Increased Conversion on 5385 Resin	15.5	0.8
Steam Stripping Conditions - New Module	24.8	1.3
Steam Leak Repair Program	31.0	1.6
Charge Water Heating Improvement	6.6	0.3
Specialty Compound Line	6.0	0.3
New Centrifugal Air Compressor	2.0	0.1
<u>CONTEMPLATED TO IMPROVE QUALITY</u>		
Larger Agitator Blades in CRP Reactors	-12.7	-0.7
<u>1980 BUDGET PROJECTS</u>		
Boiler Economizers	16.9	0.9
Centrate Rinse Water	40.0	2.0
Die Face Pelletizer	18.8	1.0

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TOTAL ENERGY CONSUMPTION AND COSTS

ABERDEEN PVC PLANT

	<u>MM BTU'S CONSUMED</u>	<u>TOTAL ENERGY COST-\$M</u>	<u>AVERAGE COST \$/MM BTU</u>
1972	1175	762	0.65
1973	1419	947	0.67
1974	1316	1053	0.80
1975	637	749	1.18
1976	775	1047	1.35
1977	783	1300	1.66
1978	1138	2202	1.93
1979	1316	3188	2.42
1980 ⁽¹⁾	1410	4137	2.93

(1) 1980 Reforecast 12/26/79

NATURAL GAS POLICY ACT OF 1978

Alternate Fuel for Incremental Pricing

Increased Cost
\$M/Year

No. 6 Fuel Oil
No. 2 Fuel Oil

160
1,700

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VINYL DEPARTMENT

VCM EFFICIENCY

The 1980 VCM efficiency objective is 1.01960 pounds VCM per pound of PVC. The following is a list of current efforts and plans to meet the VCM efficiency objective.

I. VCM LOSSES

1. Monitoring of all process valves and piping in VCM service for possible leakage.
2. Reduction in quantity of VCM vented to the incinerator through optimization of the vent refrigeration system and concerted effort from operations to reduce losses.
3. Slurry stripping averages continue to improve.
4. Process and instrumentation revisions will have a positive effect on reactor and recovery system seal failures.
5. Revisions to operating procedures and instrumentation will result in prevention of relief valve discharges.

II. REACTOR FOAMING LOSSES

1. Control of batch size has reduced periodic batch foaming.
2. Utilization of new antifoam agent has allowed increased batch size without excessive foaming.

III. COARSE BATCHES

1. Improvement in colloid make-up procedure has resulted in reduced number of coarse batches.

IV. SLURRY LOSSES

1. The strict adherence to the spill prevention program has shown no evidence of blend tank overflows.
2. Process and mechanical improvement at known slurry loss sources.

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V. PVC LOSSES

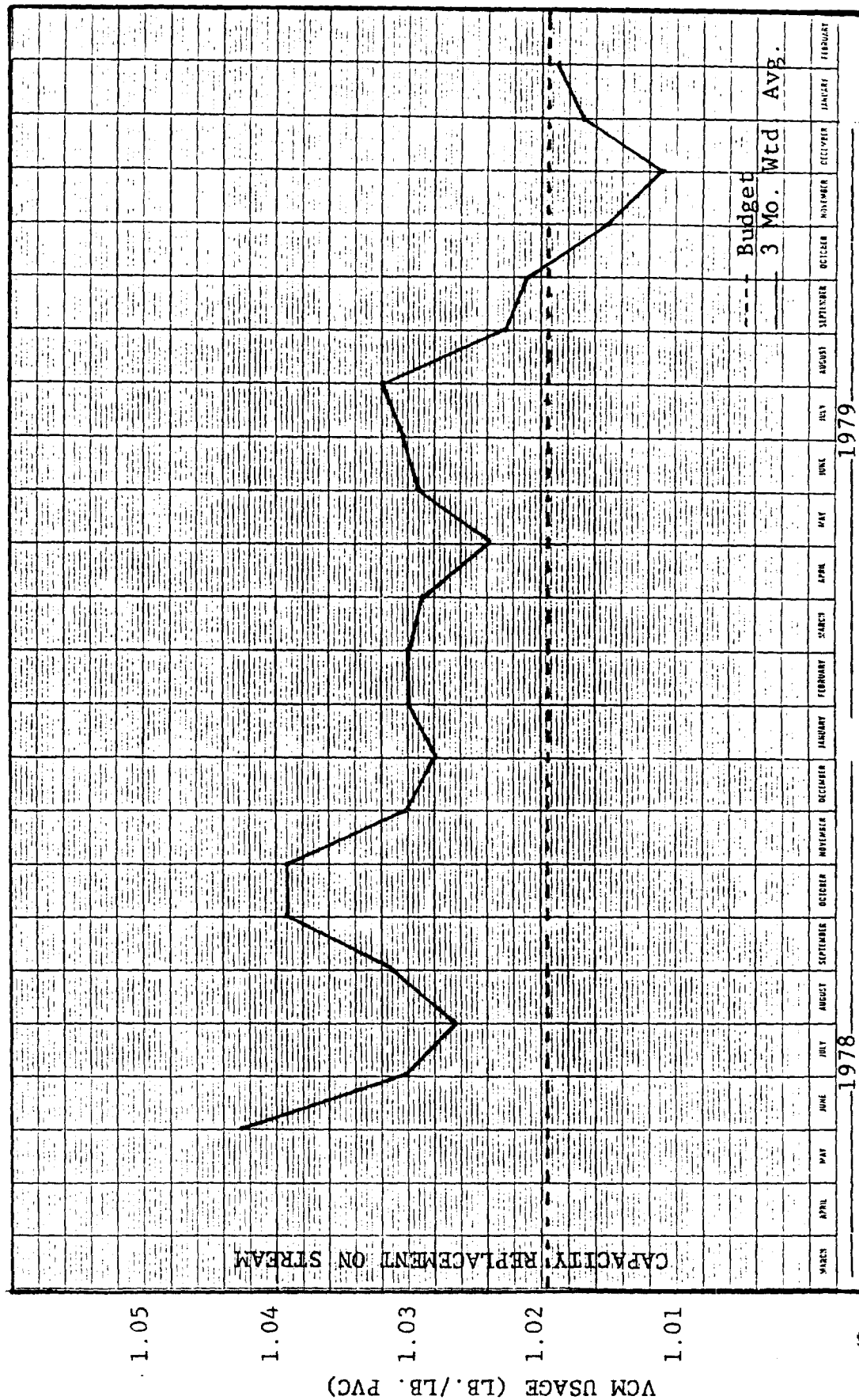
1. Dryer dust collectors were revised in 1979. This has led to marked improvement in resin losses from collectors.
2. Resin spill prevention program has led to reduction of loading losses as well as normal transfer losses.
3. Recovery of railcar heels is now possible with portable vacuum system.
4. Process and mechanical improvement at known resin loss sources.

VI. ACCOUNTING

1. Several cross-checks have been established to minimize accounting/inventory errors.
2. Truck and rail scales undergo checking on frequent basis.

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VINYL CHLORIDE EFFICIENCY



PRODUCTIVITY

I. PRODUCTIVITY MM LB./MAN YEAR

A. Total Plant

B. PVC Resin

II. COORDINATION AND PLANNING

A. Shutdowns and Turnarounds

B. Take Advantage of Weather

1. Winter

- a. Initiator Loadings
- b. Test Runs in Reactor Area
- c. Reactor Modifications
- d. 5465 Production
- e. Chemical Cleaning for Summer

2. Summer

- a. Test Runs in Dryer Area
- b. Dryer Modifications
- c. Minimize 5465 Production

C. Contingency Planning

D. Utilize Manpower Flexibility

E. Priorities

III. MAINTENANCE

A. Work Sampling

B. Reduced Emergency Work

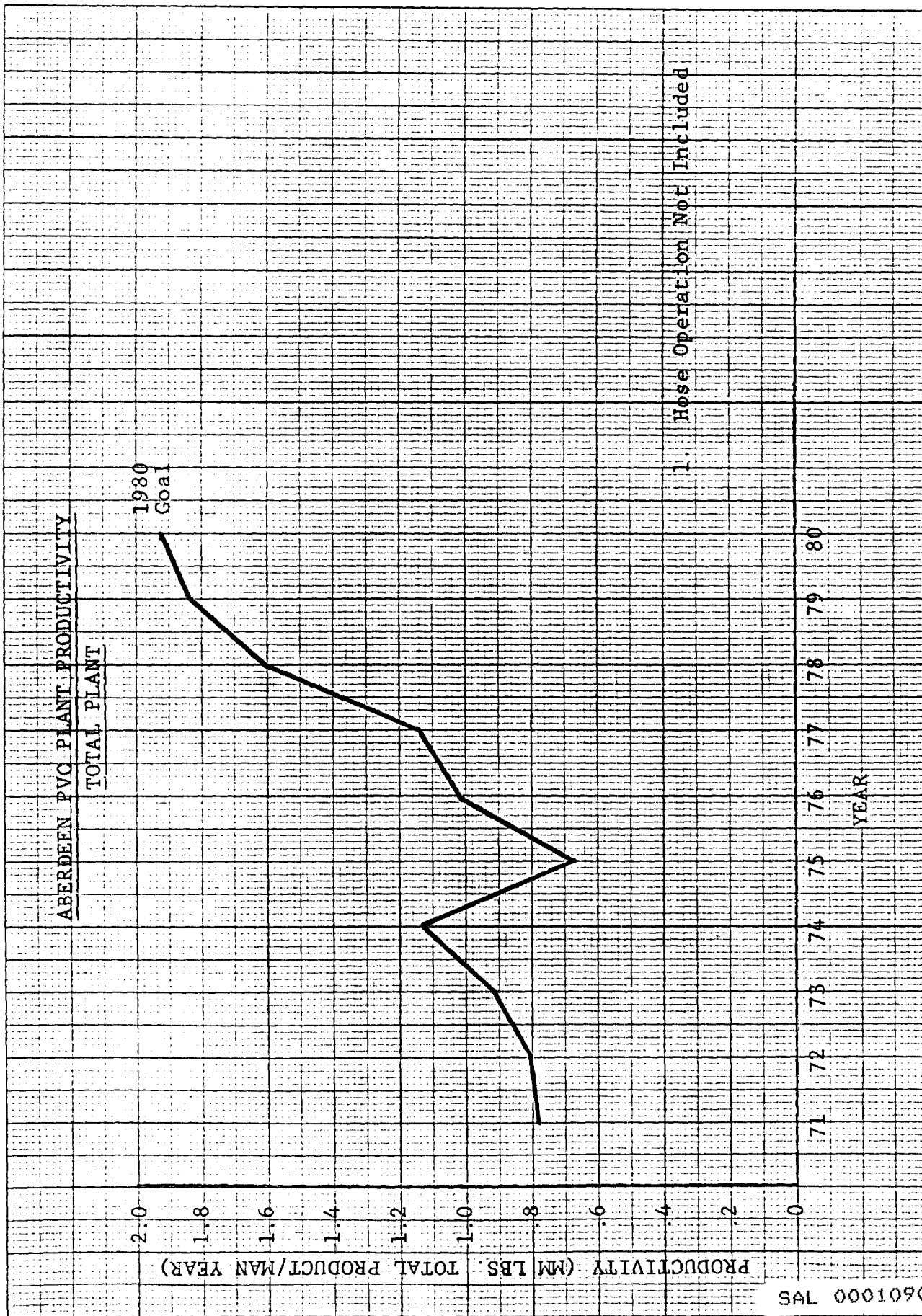
C. Improved Equipment Reliability

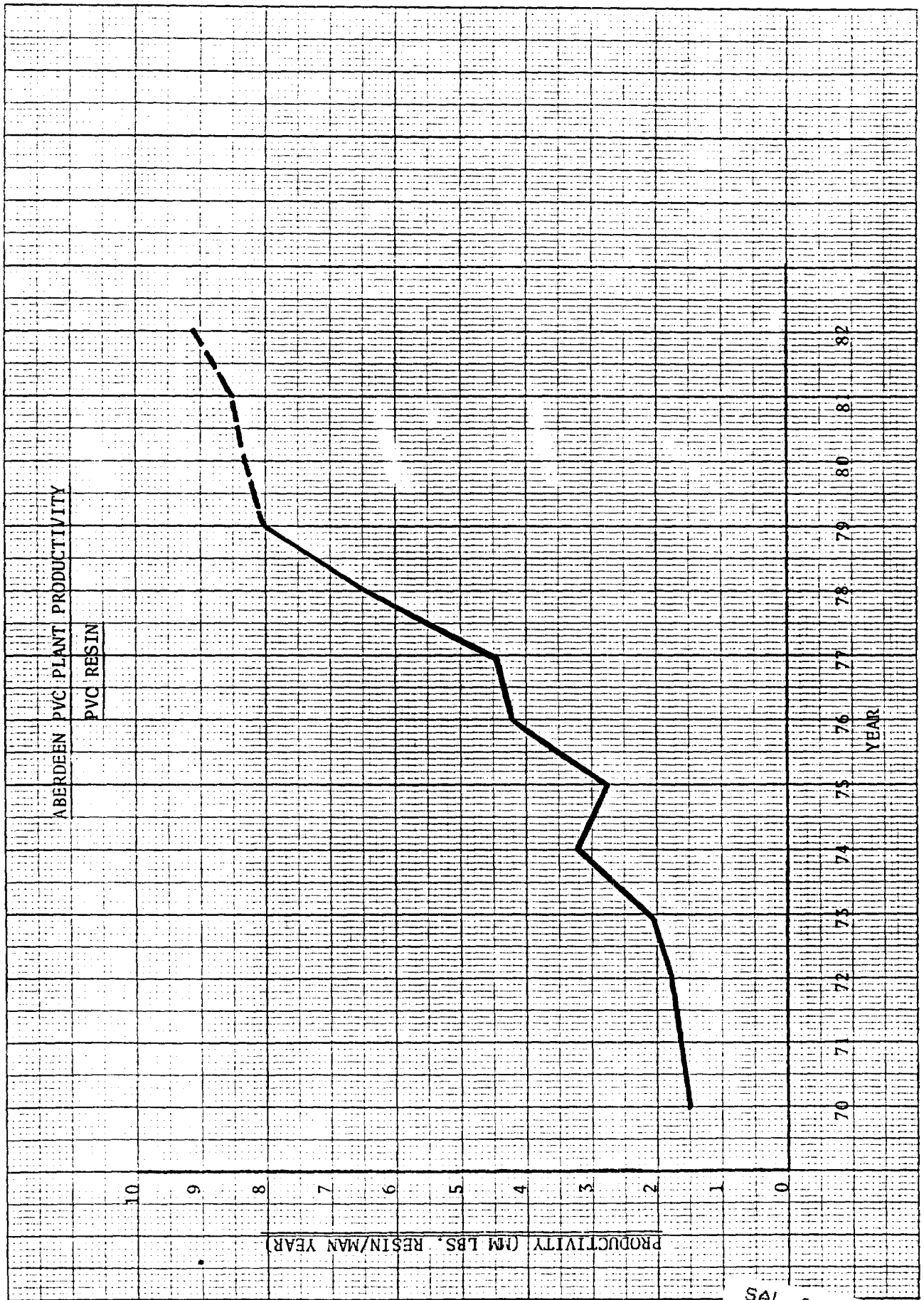
D. Reducing Repetitive Equipment Failures

E. Interaction Management

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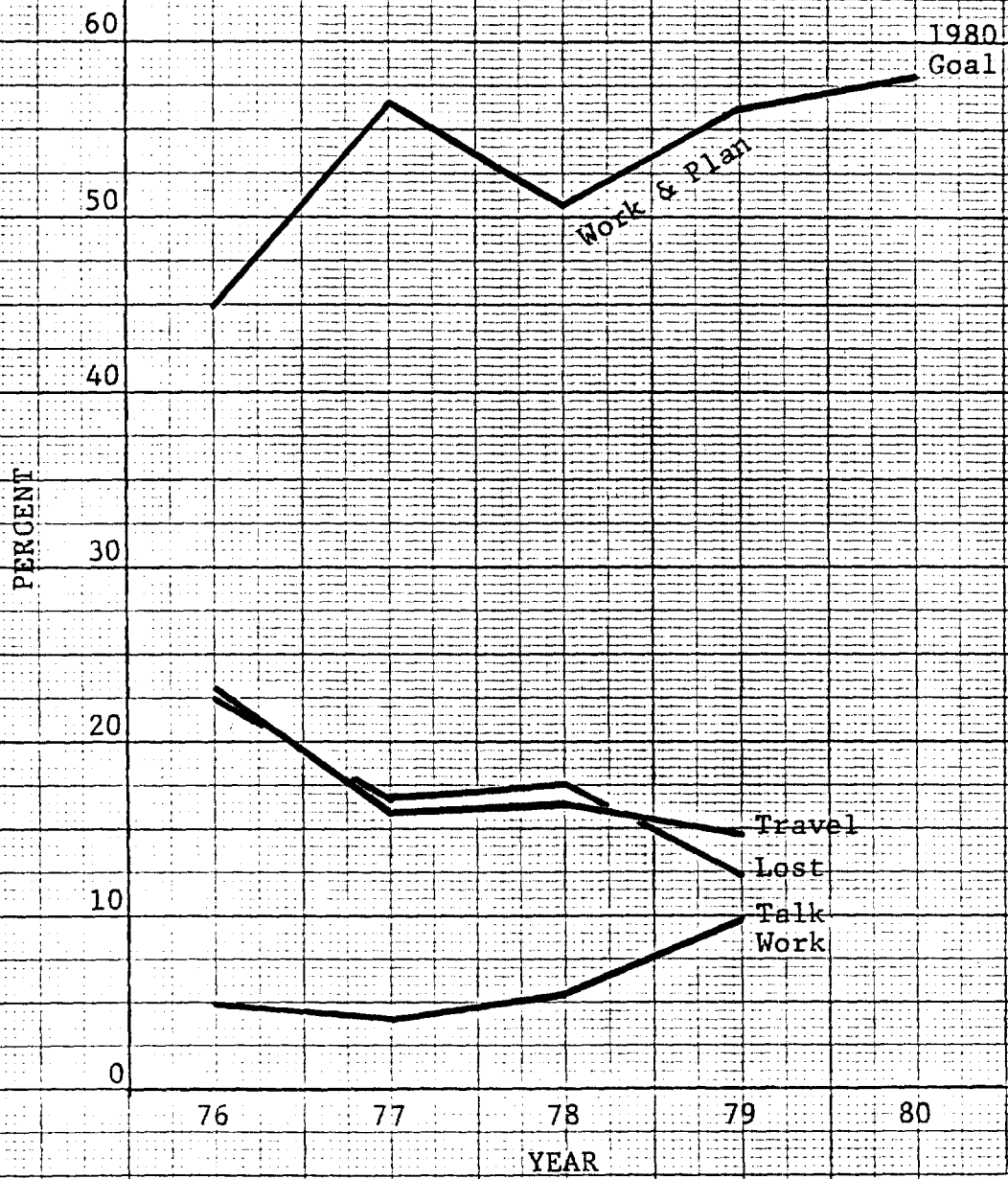
- IV. STREAM FACTOR IMPROVEMENT
- V. ENGINEERING
 - A. Debottlenecking and Automation
 - B. Project \$/Man Year
- VI. LABORATORY
 - A. Improved Equipment
 - B. Samples/Man
- VII. WORK WITH RESEARCH & ENGINEERING
- VIII. MOTIVATION
 - A. Feedback
 - B. Interaction Management
 - C. Training
 - D. Competition and Involvement



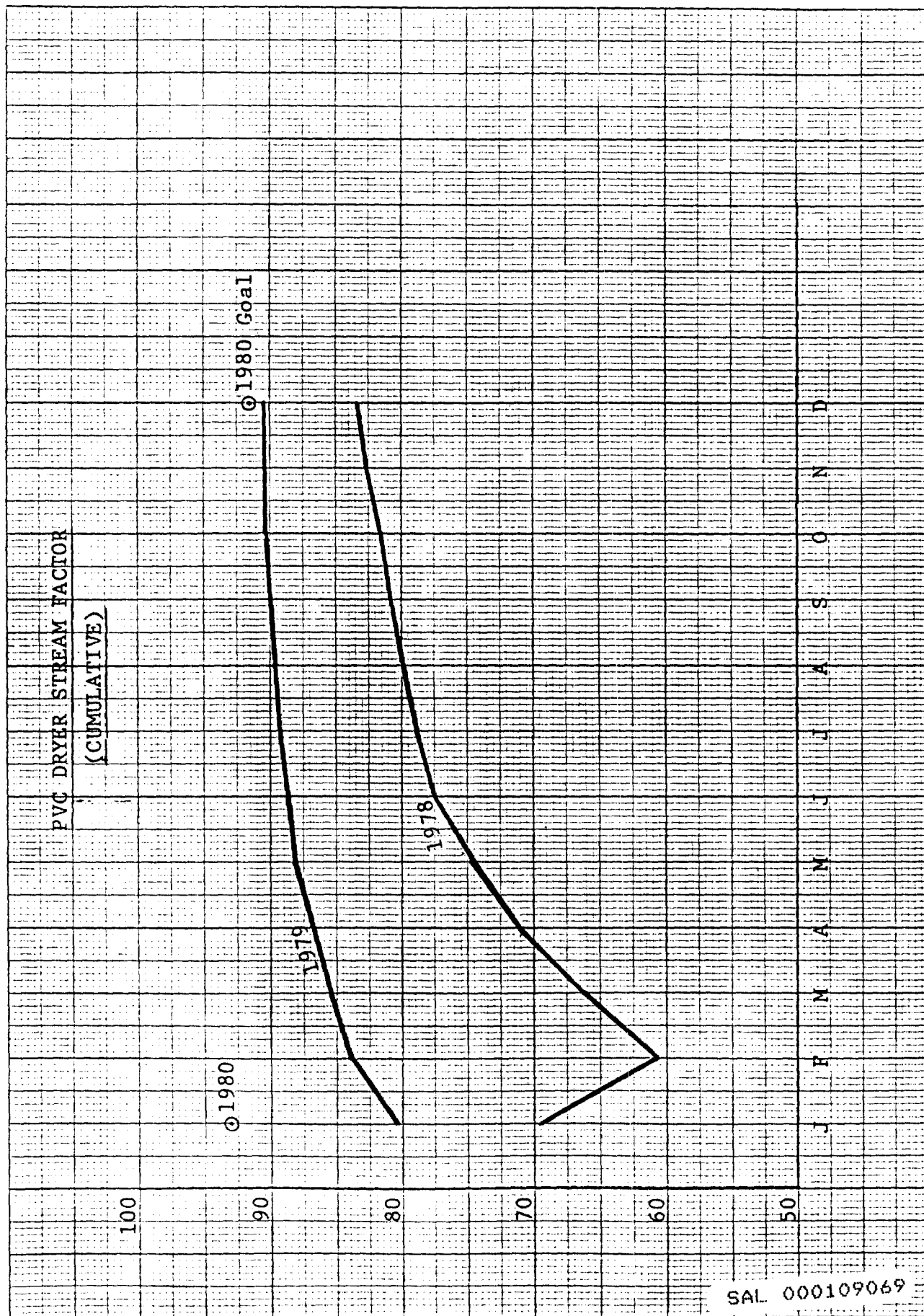


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ABERDEEN PVC PLANT
MAINTENANCE WORK SAMPLING



SAL 000109068



SAL 000109069

ABSENTEEISM - OVERTIME - RESTRICTIVE WORK PRACTICES

Absenteeism

Total absenteeism for 1979 was 3.7% of straight time hours worked.

The most significant reason for the high rate of absenteeism was the dramatic increase in the number of long-term disability cases, as compared with the previous year. In 1979, twelve employees were disabled for at least one month and, of these, four were disabled for six months or longer. Of the 10,944 absence hours lost in 1979, 9,232 were for long term disability. Less than one-half of one percent of plant absenteeism was attributable to reasons other than medically verified disability.

Given the work orientation of our employees and a strong absenteeism policy, but barring a high level of long term disabilities, we should be able to improve our performance in 1980.

Overtime

Total overtime for 1979 was 10.8% of straight time hours worked. This compares with a plant goal of 10.7%.

High overtime levels in the Vinyl Department were attributable to the use of General Helpers as resin baggers, rather than for the purpose of vacation and absence relief, as originally intended.

In the Maintenance Department, "round-the-clock" coverage was provided in many instances to minimize equipment downtime and to improve availability of maintenance services. An example is the three-week, 24 hours/day coverage provided for the agitator test run. While all known outages allowed for most work to be performed on straight-time, major emergency work often resulted in premium hours and pay, because of short notice.

Our plant goal for 1980 is 9.7%. To meet this goal, operators in the Vinyl and Compound Departments are being trained to more effectively trouble-shoot equipment problems and thereby reduce unnecessary call-ins. Additional training will be given maintenance employees to minimize repetitive repairs and the filling of Utility Department vacancies on straight time is being considered.

The operating departments will utilize absence relief personnel when available, and, when possible, vacancies will not be filled.

Restrictive Work Practices

Although our bargaining agreement does not greatly restrict management's efforts to operate the plant, there are several provisions that hamper efficiency or have the potential to do so.

ABSENTEEISM - OVERTIME - RESTRICTIVE WORK PRACTICES (Continued)

Holdover overtime in the Maintenance Department, for example, cannot be required of the employees who perform the same job on straight time. Job continuity suffers as the result. Some recent changes in overtime procedures may alleviate this problem, however.

In operations, transfers within departments, are governed by seniority. Problems occur when a work assignment is given an employee who interprets it as a transfer. In a department like Compound, where moves between lines and pieces of equipment, within the same classifications, are necessary and frequent, a strict interpretation and application of the seniority provision would be burdensome and inefficient. So far, we have managed to side-step the issue, but it will soon be tested in a grievance scheduled for arbitration.

SAL 000109071

1978

P L A N T T O T A L

(January 1 - December 31, 1978)

Department	STHW	OVERTIME			O/T as % of S/T	ABSENCES			% of STHW
		Controllable Overtime	Non-Controllable Overtime	Total Overtime Hours Worked		Hours Lost Sickness	Hours Lost Other	Total Hours Lost	
Warehouse	17,521.00	1,657.00	619.00	2,276.00	13%	8	24	32	.2%
Maintenance	75,686.50	8,171.75	134.75	8,306.50	11%	1,560	136	1,696	2%
Laboratory	39,351.25	3,735.75	2,193.75	5,929.50	15%	1,080	40	1,120	3%
Compound	63,710.25	3,532.75	3,295.00	6,827.75	11%	1,264	72	1,336	2%
Vinyl	64,398.25	7,778.75	4,436.60	12,215.35	19%	1,425	63	1,488	2%
Plasticizer	7,328.75	583.00	-0-	583.00	8%	48	-0-	48	.6%
Utility Boiler House	7,359.00	923.50	582.00	1,505.50	20%	-0-	-0-	-0-	-0-
General Plant	10,874.00	938.75	-0-	938.75	9%	272	-0-	272	2%
Total	286,229.00	27,321.25	11,261.10	38,582.35	13%	5,757	335	5,992	2.1%

*Hours for which medical verification is provided.

Non-Controllable Overtime is that overtime due to working regular hours on a holiday and working regular hours on the sixth day in operations.

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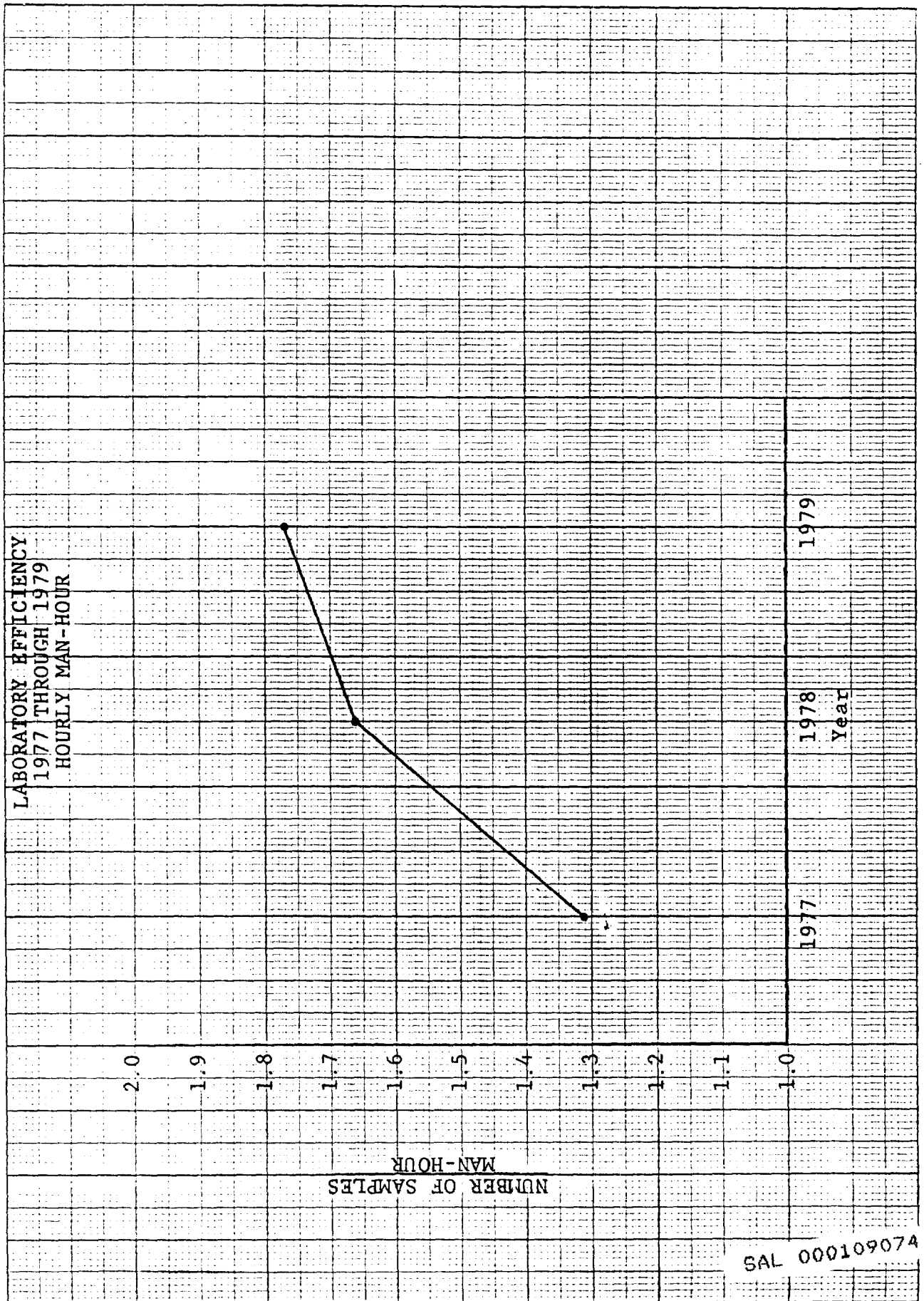
1979

P L A N T T O T A L

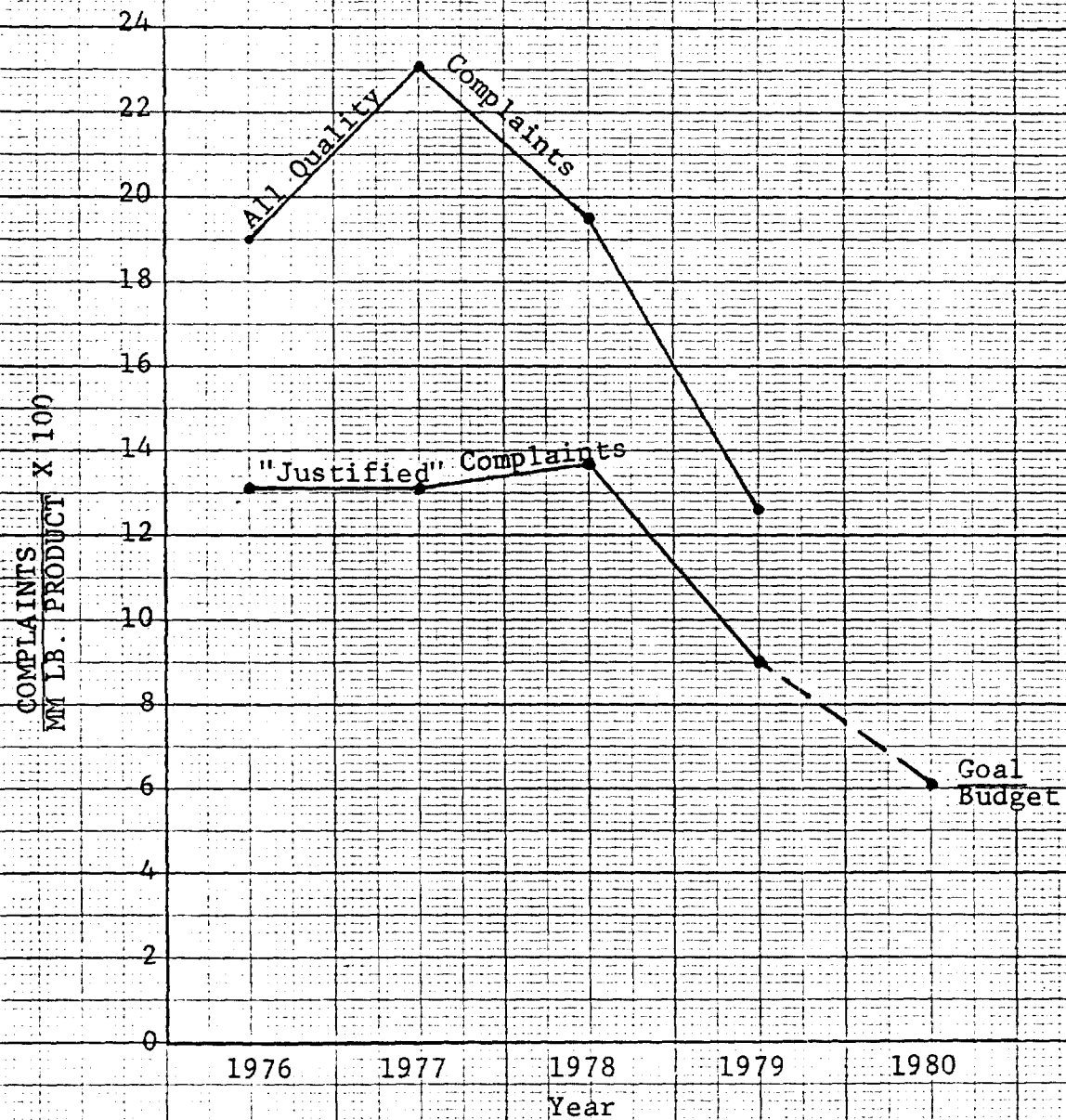
(January 1 - December 31, 1979)

<u>DEPARTMENT</u>	<u>STRAIGHT TIME HOURS WORKED</u>	<u>OVERTIME HOURS WORKED</u>		<u>OT % ST</u>	<u>ABSENCE HOURS LOST</u>		<u>ABSENCE AS % OF ST</u>
		<u>CONTROLLABLE</u>	<u>NON-CONTROLLABLE</u>		<u>SICKNESS</u>	<u>OTHER</u>	
Warehouse	16918.00	1548.25	444.50	1992.75	40	0	.2%
Maintenance	73103.90	8583.00	160.00	8743.00	2313	23	3.2%
Laboratory	39160.25	2842.25	1271.00	4113.25	1840	16	4.7%
Compound	67077.25	2908.75	2262.00	5170.75	5313	57	8%
Vinyl	70564.25	6420.00	2210.50	8630.50	1168	0	1.6%
Plasticizer	7454.00	412.00	19.00	431.00	136	8	1.9%
Utility (Maint.)	7498.00	911.75	304.00	1415.75	0	0	0
General Plant	11092.25	1151.25	0	1151.25	80	0	.7%
TOTAL	292867.90	24777.25	6671.00	31648.25	10890	104	3.7%

SAL 000109073



RATE OF QUALITY COMPLAINTS
BY YEAR



SPECIAL ITEMS
PVC RESIN EXPANSION PROJECT
STATUS REPORT

AFE amount \$12,000,000.

Litwin Engineers and Constructors selected as the engineering contractor.

A project accountant has been assigned.

Revisions to process designs complete.

All major equipment has been ordered with latest delivery scheduled by 1/1/81.

Field work expected to commence in 7/80.

Project completion expected by 7/81.

Permitting:

- NESHAPS Permit granted
- Construction Permit granted
- Effluent Limitations for NPDES Permit established

SAL 000109076

SPECIAL ITEMS
EPA COMPLIANCE
ABERDEEN PVC PLANT

RELIEF VALVE DISCHARGES

	<u>NUMBER</u>	<u># VCM</u>
1978(1)	3	3,397
1979	2	32,600
1980(2)	1	24

SLURRY STRIPPING

<u>Period</u>	<u>9/1/78 to 3/1/79</u>	<u>3/1/79 to 9/1/79</u>	<u>9/1/79 to Date</u>
Number of Days Over 400 ppm	37	2	13
Average, ppm VCM	322	199	243

- (1) August thru remainder of year
 (2) To date

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SPECIAL ITEMS

TEST PROGRAMS - 1980

<u>TYPE</u>	<u>OBJECTIVE</u>
1. Agitation	Improve Quality
2. Steam Sparging Nozzles	Reduce Vibration
3. Chain Transfer Agent for 5305	Produce at Lower Pressure <i>reduce release</i>
4. Addition of Iso-Octane to Polymerization Formula	Reduce Residual VCM in Slurry
5. Use of L-10 Instead of L-223 Initiators for 5385 Type Resin	Cost Saving
6. Drying Pond Resin	Environmental <i>dryer system to dry basin resin → salable product</i>
7. Use of Centrate Water as Reactor Rinse Water	Energy Cost Saving & Reduce Flow Thru Secondary Waste Treatment System
8. Suspending Agent Changes	Improve Quality
9. Old Reactor Agitation Revision	Increase Production and Reduce Maintenance and Labor Costs

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