Air Products and Chemicals INC.

ESCAMBIA PLANT

INTEROFFICE MEMORANDUM

To: E. A. Primeau

Date: 12 February 1976

Copies: J. T. Barr
J. M. Diamond
J. E. Greasel

From: D. H. Francke

Re: PVC Monthly Report,
January, 1976

Summary

PVC production for the month of January, 1976 was 6,443M lbs. of resin. This was a rate of 208M lbs. per day or 95.1% of budget. Major losses in production were attributable to #10 reactor being out of service for 7 days for electropolishing, contamination problems resulting in reduced rates and loss of volume due to PVC1225 being made on the North line where production rates are lower than budgeted.

Vinyl chloride efficiency for January, 1976 remained at 95.5% or at budget.

Personnel monitoring for January, 1976 showed an increase in the number of high (greater than 1.0 ppm) 8 hour TWA samples over previous months. This increase was probably attributable to the increased production rates and, due to the use of air masks, did not represent true inhaled exposure. Also, the 15 minute TWA samples remained low with 100% less than 5.0 ppm. The reactor building averaged 2.1 ppm for the month with weekly averages ranging from 0.75 ppm to 3.21 ppm.

Total variance from budget for January was ($38M) unfavorable. Major contributing unfavorable variances include ($8M) onstream for #10 reactor, ($11M) maintenance materials due to delivery of previously ordered spare parts, ($28M) business volume due to product mix, and ($17M) due to undistributed chemical cleaning costs to Calvert City. The major favorable variances for the month were $13M throughput volume, $10M labor charges, $9M support services, $47M price variance, and $17M systems variance.

January

Production for the month of January, 1976 consisted of PVC1225, PVC1230 and PVC2200. There were contamination problems in each product type during the month. Most of the contamination appeared to be from resin which had come out of the charge system. This material probably got into the charge system due to an operational problem and due to the volume, bypassed the filters into the reactors. A complete system cleanup seemed to eliminate the problem.

PVC1225 production was good during the month. All of the production was on the North product line due to the need for PVC 1230 on the South line. This helped keep the production rate below the budgeted 737 lbs. per hour (based on a 100% running time) at an actual rate of 707 lbs./hr. This was basically due to the fact that the reaction cycles on the North line are longer than on the South line and because of the reactors. Fisheye levels were generally higher than recent previous production. Although still below the specification level, this increase is probably a reflection of increased charging rates.

PVC 1230 production was good with the only quality problem being the contamination mentioned above. Actual production rates of 791 lbs./hr. (based on 100% running time) compared poorly with the budgeted 937 lbs./hr. rate (same basis). This was due primarily to the outage of #10 reactor. With this taken into consideration, the actual rate was 910 lbs./hr. The remaining difference reflects the contamination problems and lower conversions experienced.

Budgeted rates for PVC1225 and PVC1230 were figured on an 80% conversion. Both products are experiencing lower conversions of 78% and 75% respectively. This lower conversion is a reflection of lower pressure drops to enhance stripping and possibly the higher rates (shorter reaction times) being seen. If this reduced conversion is considered, the production rates of 707 lbs./hr. for PVC 1225 and 910 lbs./hr. for PVC 1230 (#10 reactor downtime taken into effect) would be comparable with rates of 719 lbs./hr. and 880 lbs./hr. which are the budgeted equivalents of PVC1225 and PVC1230.

PVC 2200 production during the month continued to experience fisheye problems with basically high 5 minute counts and 7 minute counts between 150 and 200. The fisheye size was very small and no material was offgraded. In attempts to lower the fisheye levels, the use of lauroyl peroxide was reinstituted along with the use of E-33M (t-Butyl Perneodeconate). The respective levels were varied to achieve the best fisheye levels. This helped but did not completely solve the problem. The particle size distribution was also high with most samples having 40-50% retained on a 50 mesh screen. Variations in the Ultra Wet 60 and MBCP levels made little or no effect in the particle size. This problem will continue to be worked on in February. A special two lot run of PVC 2200 using a latex additive was made during January. This run showed some improvement in both fisheyes and particle size. The material was bagged for customer samples. The problem with fisheyes is a continually reoccurring problem with the PVC 2200. This problem continues to need to be worked on in the laboratory to provide the unit with information on the effective ratios of MBCP/Ultra Wet 60L, their effectiveness vs. pH, and the effects of different initiators or combinations on fisheyes and/or the suspending system. This work must get some priority over currently planned work if consistently good PVC 2200 is to be made, a necessity if some customers are to use PVC 2200.

Residual monomer levels in finished resin continued at the levels experienced in December, 1975. Although the levels in the lots fluctuated, the shipment analysis continued to be below 50 ppm. The fluctuation in the lot analysis is a reflection of the increased charging rates, even with the new stripper. Below is a summary of the analysis for the month. The numbers in parenthesis under PVC 1230 and PVC 2200 are the averages if several high readings were not included in the averages. Although these high values were not reasonable, the analysis was not repeated since they were on lot composites, not bulk cars.

PVC Resins Residual VCM
January, 1976

	1225	1230	2200
# Lots	31	91 (85)	26 (24)
Avg. VCM	41	53 (43)	40 (31)
# Shipments	6	19	5
Avg. VCM	27	31	16

Maintenance repairs during January were generally minor with respect to production. Considerable electrical time was spent on determining the sudden cause of problems with running two fans and one pump on the east PVC cooling tower. It seemed that with one pump and one fan, running power would remain on the tower. With startup of the second fan, the circuit would trip. The cause was traced back to an improper trip being used and the addition of two Masar backup pumps on the same circuit, which were running. This problem was corrected. The valve on the Nash compressor separator level control caused extensive problems when it began to plug. The replacement valve had never been received so the order was canceled and a spare automatic valve from the old vinyl acetate charge system was installed.

#10 reactor was finally electropolished in January. The reactor was out of service for 7 days (168 reactor hours) while the work was done. The walls had been mildly attacked but they took what was called a "good" polish. The reactor was put back in service and is running very well from a fouling aspect. High amperage is still causing cleaning on a 7-8 batch frequency but fouling is minimum at that time. Prior to polishing, cleaning due to fouling was every 3-5 batches.

Considerable OSHA related work was done during January. This was generated from two sources. First, all purge systems were reworked to secure good sealing and dispersion and process equipment continued to be tied into compressors, both activities designed to reduce worker exposure. The duct work and valving in the purge systems were checked for leaks and were repaired where needed. To eliminate back draft into the building from these vents, one was extended to above the building and two others had rain caps removed to permit line velocity to carry the gases further above the building. Work on the process equipment included piping to connect the weigh tanks and filters into the recovery system to facilitate maintenance work. The second source of projects for OSHA compliance for a "mock" OSHA inspection by the plant and group safety engineers. This inspection generated some specific items which were quickly corrected plus several general areas which are being worked on.

Personnel Monitoring

The personnel monitoring during January continued with the frequency being twice/month per man entering the PVC area. The sampling schedule is set up to monitor each person entering the PVC area during the month on an 8 hour TWA and a 15 minute TWA sample. The result for January showed that on a total of 67-8 hour TWA samples, 28% were below 0.5 ppm, 48% were below 1.0 ppm and 78% were below 3.0 ppm. Of a total of 42-15 minute TWA samples, 69% were below 0.5 ppm, 79% were below 1.0 ppm, 96% were below 3.0 ppm and 100% were below 5.0 ppm.

8 HOUR SAMPLES

PPM	<.5	.5-1	1-3	3-5	5-10	10-15	>15
Supervisor	1	3	3	1	1		
Senior	3	1	3				
Reactor	1		2			2	1
Solution	1	2	1	1		1	
Recovery	3	1	2	1			
Finishing	1	2	3				
Utility	2		4		3	1	2
Artisan	3	1	1	1			
Maintenance	4	3	1				
Subtotals	19	13	20	4	4	4	3
% of Totals (67)	28%	20%	30%	6%	6%	6%	4%

15 MINUTE SAMPLES

Supervisor	4		1	
Senior	3	1		
Reactor	4			
Solution	3			
Recovery	4	1		
Finishing	2		1	
Utility	4		1	2
Artisan	2		1	
Maintenance	3	2	3	
Subtotals	29	4	7	2
% of Totals (42)	69%	10%	17%	4%

The area monitoring system showed some fluctuation in levels in the reactor building during the month. The system showed weekly averages through the month of 3.21 ppm, 1.07 ppm, 2.24 ppm, 2.39 ppm, and .75 ppm. The monthly average was 2.10 ppm. The reduction in the final week's average is at least in part due to the revisions and repairs to the purge systems and a restating of the procedures for operators to follow in keeping VCl levels down. These areas will continue to be worked on for more improvements.

Future Plans

Continued work on OSHA compliance and projects will progress through the future with a major effort over the next several months to assure compliance. This work will include:

1. Upgrading of the area monitoring system by the use of a computer designed for chromatographic analysis. This upgrading will be necessary to assure reliability, provide expandability for the future and to provide capability to analyze other contaminants which may be regulated in the future (TCE, DMF, etc.).

2. Continued work on increasing the recovery capabilities of VCl from all equipment prior to opening.

3. Improved operator/maintenance training and training programs.

Work on the improvement of fisheye levels in PVC2200 will be done at the plant to try and achieve the necessary relationships between suspending agents, initiators and pH to control future runs.

D. H. Francke

DHF/cd

Attachments

JANUARY VARIANCE FORECAST

PVC

		Dec. 30th	15th	28th	Actual	Variance Explanation
A.	**Production Related Variance**					
I.	Raw Material Efficiency	7	(4)	(16)	1	15th - VCl efficiency at 96.0%, high initiator usage due to higher rates. 28th - VCl eff. at 94.5%, high initiator usage both due to higher rates.
II.	Volume					
	a) Throughput	29	15	6	13	15th - Production higher than std.
	b) Onstream	-	-	(6)	(8)	28th - prod. slightly below bud. due #10 reactor O.O.S
	c) Offgrade	3	1	4	7	and contamination problems.
III.	Spending (Use)					
	a) Labor	2	5	5	5	15th - salary costs based on pay increases not yet experienced.
	b) Maintenance Labor	(2)	-	-	5	
	c) Maintenance Material	-	-	-	(11)	Act. - unexpected chgs. from material ordered in
	d) Utilities	2	2	2	(1)	FY1975.
	e) Other	15	20	20	9	15th - lower than budgeted use of service organisations
	Total Spending (Use)	17	27	27	7	
IV.	Spending (Rate)					
	a) Facility Services and Overheads	4	2	2	3	
	b) Nonfacility Services and Overheads	-	-	-	2	
	c) Depreciation, Taxes & Ins.	-	-	-	1	
	d) Labor, Salaries, Fringes	-	-	-	-	
	Total Spending (Rate)	4	2	2	6	
TOTAL PROD. RELATED VARIANCE		60	41	17	26	
B. V.	Purchase Price Variance					
	a) Raw Material	72	(40)	(40)	47	15th - VCM price increased to 13¢/lb. as
	b) Purchased Utility	4	2	2	(1)	compared to budget of 12.0¢/lb.
	c) Other	-	-	-	-	Act. - VCM price based on rolling avg. Materials bought in Dec. used in Jan.
	Total Purchase Price	76	(38)	(38)	46	
C. VI.	Business Variances					
	a) Volume	-	(28)	(19)	(28)	15th - product mix volume effect.
	b) System Variance	3	7	7	17	
	c) Other	(17)	(9)	(9)	(17)	15th - return of only partial DMF commitment from
	Total Business Variances	(14)	(30)	(21)	(28)	Calvert City.
TOTAL PROD. COST VARIANCES FROM STD.		122	(27)	(42)	44	
VII.	Budgeted Variances					
	a) Raw Material Cost	49	49	49	49	
	b) Purchased Utilities Cost	-	-	-	-	
	c) Volume	18	18	18	18	
	d) Spending	-	-	-	-	
	e) System	15	15	15	15	
	Total Budgeted Variance	82	82	82	82	
TOTAL VARIANCES FROM BUDGET		40	(109)	(124)	(38)	

MATERIAL BALANCE PMB01S

ESCAMBIA PVC PLANT

MONTH ENDING 31 JAN 76

	LBS SUB-TOTAL	LBS TOTAL	% OF VCL CHARGED SUB-TOTAL	% OF VCL CHARGED TOTAL
A VCL USED BASED ON BILLING WEIGHTS		6,748,411		100.00
B PVC OUT TO PRODUCT		6,446,000		95.52
1. PVC PRIME	6,318,000		93.62	
2. PVC OFF-GRADE	128,000		1.90	
C PVC LOSSES		88,478		1.31
1. PVC TO DUMP AS SCRAP	40,873		.61	
2. DRYER DISCHARGE	328		.00	
SOUTH LINE 165				
NORTH LINE 163				
3. PVC IN EFFLUENT WATER	47,277		.70	
D VCL LOSSES		37,852		.56
1. DRYER DISCHARGE	37,446		.55	
SOUTH LINE 24,127				
NORTH LINE 13,319				
2. STRIPPER EVACUATION	5,276		.08	
NORTH 3,989				
SOUTH 1,287				
3. VCL IN EFFLUENT WATER	386		.01	
4. VCL FROM OPEN REACTORS	16,557		.25	
5. VCL FROM BLEND TANK VENT	1,237		.02	
6. VCL FROM CONDENSER VENT	7,540		.11	
7. VCL FROM REACTORS VENT			.00	
8. VCL FROM PURIFICATION COLUMN			.00	
9. VCL WEIGHT DIFFERENCE	30,590-		.45-	
TOTAL ACCOUNTED FOR OUT		6,572,330		97.39
TOTAL UNACCOUNTED FOR		176,081		2.61

MATERIAL BALANCE PMB015

ESCAMBIA PVC PLANT

Y T D ENDING 31 JAN 76

	LBS SUB-TOTAL	LBS TOTAL	% OF VCL CHARGED SUB-TOTAL	% OF VCL CHARGED TOTAL
A VCL USED BASED ON BILLING WEIGHTS		23,559,466		100.00
B PVC OUT TO PRODUCT		22,496,550		95.49
1. PVC PRIME	21,289,000		90.36	
2. PVC OFF-GRADE	1,207,550		5.13	
C PVC LOSSES		177,003		.75
1. PVC TO DUMP AS SCRAP	108,313		.46	
2. DRYER DISCHARGE	1,435		.01	
SOUTH LINE 710				
NORTH LINE 725				
3. PVC IN EFFLUENT WATER	67,255		.29	
D VCL LOSSES		223,281		.95
1. DRYER DISCHARGE	104,545		.44	
SOUTH LINE 70,761				
NORTH LINE 33,784				
2. STRIPPER EVACUATION	18,032		.08	
NORTH 13,979				
SOUTH 4,053				
3. VCL IN EFFLUENT WATER	2,024		.01	
4. VCL FROM OPEN REACTORS	75,404		.32	
5. VCL FROM BLEND TANK VENT	3,397		.01	
6. VCL FROM CONDENSER VENT	28,661		.12	
7. VCL FROM REACTORS VENT	10,000		.04	
8. VCL FROM PURIFICATION COLUMN			.00	
9. VCL WEIGHT DIFFERENCE	18,782-		.08-	
TOTAL ACCOUNTED FOR OUT		22,896,834		97.19
TOTAL UNACCOUNTED FOR		662,632		2.81