

R. A. Conrad
Aberdeen Plant PVC Yield
May 22, 1978
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4. Since mid-February, the plant has been operating the equipment associated with the Capacity Replacement Project. Substantial losses associated with operational problems have occurred in this unit. During April, failures occurred due to
- a) Reactor rupture disk-relief valve,
 - b) Recovery system sight glass,
 - c) Reactor-condenser gasket, and
 - d) Reactor agitator blades

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The April yield study involved the following work:

- 1. Received vinyl chloride railcars were each weighed into and out of the plant to verify VCM input.
- 2. Daily VCM inventories were calculated and compared to batch charge amounts.
- 3. Three dryer stack emissions tests were conducted based upon EPA approved methods.
- 4. Water samples were obtained for PVC solids content:
 - a) Dryer centrate samples - 25 per month
 - b) Reactor rinse samples - 15 per month
 - c) Blowdown tank drain samples - 40 per month
 - d) Total process effluent samples - 32 during month
 - e) Samples of Chem Wash - 2 during month
- 5. Inventory verifications were made daily of dry blend and compound resin usage.
- 6. Accounting calculation methods were checked to insure accuracy.

The final report containing detailed analyses and calculations of the April work is in preparation. A copy of the full report will be sent to you when complete. The essential results are indicated below.

Through process sampling and monitoring, the majority of process losses were identified. Approximately 89% of the 986,381 pounds can be located. These losses are listed on the attached table.

Items 1 to 5 (156,000 pounds) were caused by equipment or instrument failures. These are essentially non-recurring losses.

Items 7 and 8 (17,200 pounds) will require mechanical improvements to eliminate. Action steps are in progress or have been completed.

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Item 9, reactor rinse loss (116,800 pounds) is, to an extent, inherent in the process. This can be minimized by operator attention. Operations now samples and grades operators based upon solids content in rinse water.

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Item 10, foaming loss, is the largest loss identified (268,000 pounds). This loss was caused by the failure of both recovery inlet control systems. Additionally, the attempt to maintain a 5.5 minute dry time also amplifies foaming. The control system repairs are complete. OMS addition could negate the foaming tendency at low dry times.

At the level determined Items 11 and 12 (33,300) are inherent in the process.

Items 13 and 14 (90,000) are also inherent in the process. These dust collectors represent environmental design treatment technology.

Items 15 and 16, (15,300) are acceptable and are the slurry and water residual VCM content.

Item 17 (80,100) was excessive due to a refrigeration system failure. Tie-ins have now been completed and this loss is now less than 6000 pounds per month. At this level, this is an inherent process loss.

Items 18, 20, 22 and 23 (7500) are inherent losses for which no corrective actions are feasible.

Item 19, (46,500) is somewhat high. "Wearing In" of reactors seems to occur after startup. During this period cull formation seems to be high compared to normal operations. This was observed with D-500 and D-600 as well as at Oklahoma City. We are now experiencing this with the CRP reactors.

Item 21 (41,600) is an estimate based upon the loss of one pound per bag of material. This estimate seems realistic from visual observation of the losses encountered during debagging.

In summary, the study during April did not identify any major, single, cause of yield loss. The sum of all identified losses did account for about 90% of the material lost. Feasible corrective actions have been taken. The greatest identified loss, foaming, will require a process operational change to correct. This change (OMS addition) will be a 1979 Capital Budget project. A means of selective OMS addition is being installed and when operable will reduce the nature of this loss.

We are continuing to sample the mentioned loss points. If any major losses occur corrective operating actions will be instituted.

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We have also requested assistance of PED and R & D on this problem.
We have asked for manpower for a week long process surveillance test.
This would be to verify that all major loss sources have been accounted
for. As of now we expect this surveillance test to be conducted the
second week in June.

Douglas Michels JFH
Douglas Michels
Chief Process Engineer

tap

c: OGD-ELK-DWF-JFH

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TABLE I

APRIL PROCESS YIELD LOSSES

ABERDEEN PVC PLANT

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1. 5305 Coarse Batch Due to Agitator Failure (4)	36,000
2. 5425 Coarse Batch in D-400 (4)	25,000
3. Reactor Rupture Disk-Relief Valve Failure (4)	25,000
4. Reactor-Condenser Gasket Failure (4)	20,000
5. Recovery Line Sight Glass Blowout (4)	30,000
6. Blend Tank Overflow (4)	20,000
7. 407 Blend Tank Agitators Seal Failure (4)	2,000
8. CRP Dump System Control and Leakage Problem (4)	15,200
9. PVC Loss in Reactor Rinses (1)	116,800
10. Losses Due to Batch Foaming (1)	268,000
11. Losses of PVC In Chem Wash (1)	14,500
12. PVC Lost in Dryer Centrate (1)	18,800
13. Dryer Dust Collector Losses (1)	70,500
14. Silo Dust Collector Losses (3)	20,000
15. VCM Loss Due to Slurry Residual Content (1)	10,300
16. VCM Loss Due to Blowdown Water Residual Content (1)	5,000
17. VCM Loss Due to Receiver Venting (3)	80,100
18. VCM Loss Due to Reactor Opening Loss (1)	2,000
19. Reactor Culls (2)	46,500
20. PVC Dusting During Bagging (4)	500
21. PVC Lost Due to Debagging (4)	41,600
22. PVC Lost During Railcar Loading (4)	5,000
23. PVC Consumed in Process Sampling (2)	4,000
TOTAL	876,800

(1) Based upon the average of all samples obtained during April.

(2) Based upon weighed amounts.

(3) Based upon equipment design data.

(4) Based upon observation estimates.

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4/78 Progress Report

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I. Propane Vaporizer Replacement

The completion of the process design awaits final vendor data.

J. Plasticizer-Stabilizer Weighup System

Revisions to this design are in progress.

K. Plasticizer Chemical Exposure Abatement

The plant reviewed the process design by PED. CED is now preparing a definitive estimate.

L. Plant Yield Loss Study

An extensive effort was made during April to locate and define all sources of VCM or PVC yield loss. Some of the steps taken were:

1. Each railcar of VCM was weighed prior to and after unloading.
2. Vinyl chloride inventories were obtained daily and compared to the tabulated reactor charge sheets.
3. An attempt was made to quantify the four major non-recurring losses during the month:
 - a) 744 Coarse 5305 batch - 45,000 pounds
 - b) Recovery System Sight Glass Blowout - 15,000 pounds
 - c) Reactor Relief Valve Emission - 30,000 pounds
 - d) Reactor Flange Blowout - 30,000 pounds
4. Periodic samples were obtained of chem wash and rinse water to look for resin losses.
5. Periodic samples were obtained of blowdown tank water to look for resin losses.
6. Periodic samples were obtained of secondary influent water to look for losses.
7. Estimates were made of spills from the dump systems and blend tanks.
8. Dryer stack emission tests were conducted.
9. Centrate samples from each dryer were obtained weekly.
10. Dry blend usage is being determined several ways.
11. Each railcar and truck of PVC is being weighed out.

All of the data taken during April is now being analyzed. A report will be published late in May.

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