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SUBJECT Waste Water Flow Rates - Flemington J. Jacob
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Due to the impending EPA regulation on VCM levels in the process discharge water, determination of various flow rates are necessary to prepare the design of an operation to strip the water. At this point, the streams of primary concern are the vapor containment tank overflow, overflow from the barometric tank, and floor drains from the reactor building. Data on the flowrates for each of these streams, as well as VCM content, has been taken by Process Engineering and these results are summarized below.

A recording ammeter was installed on the vapor containment tank discharge pump to monitor the time the pump is in operation. From the data gathered over a three day period, a flow rate of 8,000 gallons per day was determined for this stream. An earlier study showed this stream to have a VCM content of 150 ppm and a VAcM content of 1500 ppm.

Data was generated on the overflow from the Barometric Tank to determine its flow rate. From this data, it can be seen that the overflow from the tank is dependent on the number of batches stripped. This flow was determined to be 60 gallons per batch stripped. This stream had a VCM content of 550 ppm and VAcM content 1.2%. It should be noted that the volume of this stream will increase with the implementation of reactor recovery techniques to allow compliance with the impending EPA regulation on vessel openings. At the present time an accurate flow cannot be determined, but an estimate in the range of 60 gallons per batch can be projected.

An attempt to determine the flow rate of the floor drains from the reactor building was made, and a rate of 10 GPM was obtained. Although the VCM content of this stream was below the 10 ppm limit, this stream had a 3.5 ppm VCM level data was generated to document this flow rate in the event that this might have to be treated in the future. The VAcM level for this stream fluctuated from a low of 66 ppm to a high of 617 ppm with an average of 275 ppm.

A summary of the data mentioned is shown in Table I.

RAD:r
Attachment

R.A. Donovan

RA Donovan (R)

TABLE I: SUMMARY OF RESULTS

STREAM	FLOWRATE	VCM LEVEL	VAcM LEVEL
Vapor Containment Tank Discharge	8,000 <u>Gal</u> Day	150 ppm	1500 ppm
Barometric Tank OverFlow	60 <u>Gal</u> * Ba	550 ppm	1.2%
Reactor Bldg Floor Drains	10 <u>Gal</u> Min	3.5 ppm	275 ppm

* With the implementation of Reactor Recovery Techniques, an estimated increase of 60 gal/ba has been projected.

WATER DRAIN AND VAPOR RECOVERY

EPA REQUIREMENTS

BURLINGTON RESIN PLANT

ESR-500

*not including
water from carbene tower*

The waste water streams containing VCM are as tabulated in Appendix A. Due to the multitude of source points and manpower requirements, it was agreed with Analytical Services that typical points would be sampled. These points are shown in Appendix B.

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In addition to these semi-continuous waste water streams, there are additional streams that will be from process equipment during yearly shutdown or maintenance requirements. As an example, during PVC shutdown 1000 gallons of DM water are charged into an empty reactor. Reactor is evacuated, heated and vacuum broken with nitrogen. Water is then dumped to floor. This stream must be directed to the inplant storage facilities. Residual VCM concentrations in the water will be above the EPA limits of 10 PPM and therefore must be treated. Similar procedures are used in the copolymer and plastisol plants.

The VCM storage tanks when taken out of service will be another source point of VCM laden water. The contents will be transferred to a new collection tank prior to stripping and recovery of VCM.

SCOPE OF WORK

Data thus far collected indicates the need to provide storage and transfer equipment at various waste water disposal locations. The fume scrubber effluent from both plastisol "A and B" plants will be repiped to a 750 gallon receiver located on the East side of "A" plant. This tank will be provided with a high and low level pump cut-off. A 30 GPM pump will transfer the water

to a storage tank. The fume scrubber effluent water from "B" plant is 17 GPM and 5 GPM from "A" plant.

The stream flow from the barometric sump of the new homopolymer recovery system installation is 5 GPM. A new 200 gallon receiver with high and low level pump cut-off and 5 GPM pump to transfer the stream into a new storage tank is included.

The effluent stream from #7 blend tank will be repiped and provided with a transfer pump. Also included will be a filter to remove carryover PVC products from recovery operations. Preliminary analysis indicates a solid content of 2.56%.

The water drains of the individual knock-out pots from the O₂ analyzers at each recovery compressor will be collected in a small receiver and be transferred to the storage tank utilizing nitrogen pressure as the motive force.

The water used in the PVC reactors during shutdown for flushing will be transferred under nitrogen pressure to the new collection water tank. Also the same water from the copolymer reactors will be transferred to the same tank. This same procedure will apply to the Plastisol Towers.

Preliminary indications are that all measured streams to be treated will approximate 50 GPM. Average concentrations of samples analyzed is 2400 PPM VCM. With the continuous flowing stream amounting to 35 GPM, or 16,800 gals/shift and with the introduction of reactor water, storage tank water and other sources, a 30,000 gallon tank is required.

8 hr hold-up

The continuous stripping system being contemplated is a distillation tower with sieve trays, condenser, compressor vacuum pump, accumulator, bottoms drum, pumps, etc. Water overheads will be condensed with vapors sent to a compressor and then to the carbon adsorption unit. Bottoms from the tower will be sent to the waste treat plant. The use of this type of stripper as against a packed tower is required due to the solids loading of the various streams.

APPENDIX A

WATER - VCM SOURCE STREAMS

A. COPOLYMER PLANT

1. Recovery MVAC Sump Overflow
2. #1 Stripper Cond. Barometric Leg
3. #1 Stripper After Cond. Barometric Leg
4. #2 Stripper Cond. Baro. Leg
5. #2 Stripper After Cond. Baro. Leg
6. #1 Recovery Line
 - 1st Stage Knock-out Pot Drain
 - 1st Stage Comp. Drain
 - 2nd Stage Knock-out Pot Drain
 - 2nd Stage Comp. Drain
 - 1st-2nd Stage Distance Piece Drain
 - 1st Stage Surge Pot Drain
7. #2 Recovery Line
 - 1st Stage Knock-out Pot Drain
 - 1st Stage Comp. Drain
 - 2nd Stage Knock-out Pot Drain
 - 2nd Stage Comp. Drain
 - 1st-2nd Stage Distance Piece Drain
 - 1st Stage Surge Pot Drain
8. #1 and #2 Copo. O₂ Analyzer Knock-out Pot Drains

B. HOMOPOLYMER PLANT

1. #4 Recovery Line
 - 1st Stage Knock-out Pot Drain
 - 2nd " " " "
 - 1st Stage Comp. Drain
 - " " " "

2. #5 Recovery Line-To #7 Blow-Down Tank

1st Stage Knock-out Pot Drain

2nd " " " "

1st Stage Comp. Drain

2nd " " "

3. PVC Recovery System Blow-Down Tank

4. #7 Blow-Down Receiver (Slurry Tank)

#4 Foam Knock-out Tank Drain

#5 " " " "

#4 Interstage Receiver Drain

#5 " " "

#3,4,5,&6 O₂ Analyzer Knock-out Pot Drains

#2 Master Mix Tank Drain

#1 " " " "

PVC Recovered Monomer Rec. Drain

Plastisol Recovered Mon. Rec. Drain

#1 Copo. Foam Knock-out Tank Drain

#2 " "

5. Homopolymer Recovery System Sump Overflow

C. PLASTISOL "A & B" PLANT

1. #3 Recovery Line-To Comp. Blow-Down Tank-Yard

1st Stage Knock-out Pot Drain

2nd " " " "

1st Stage Comp. Drain

2nd " " "

2. #6 Recovery Line-To Comp. Blow-Down Tank-Yard

1st Stage Knock-out Pot Drain

2nd " " " "

1st Stage Comp. Drain

2nd Stage Comp. Drain

3. Fume Scrubber "A" Plant

4. Fume Scrubber "B" Plant

APPENDIX B

WASTE WATER STREAMS EPA PROJECT DEI - 500

- A. Copolymer Recovery MVAC Sump Overflow
- B. # 1 - Stripper Condenser Barometric Leg
- C. # 1 - Stripper After Condenser Barometric Leg

1 - Recovery Line

- D. 1st Stage K.O. Pot Drain
- E. 1st Stage Compressor Drain
- F. 2nd Stage K.O. Pot Drain
- G. 2nd Stage Compressor Drain
- H. 1st - 2nd Stage Distance piece Drain
- I. 1st Stage Surge Pot Drain
- J. # 1 + # 2 Cop. O₂ Analyzer K.O. Pot Drains

4 - Recovery Line (Homo)

- K. 1st Stage K.O. Pot Drain
- L. 2nd Stage K.O. Pot Drain
- M. 1st Stage Compressor Drain
- N. 2nd Stage Compressor Drain

6 - Recovery Line (Plas.)

- O. 1st Stage K.O. Pot Drain
- P. 2nd Stage-K.O. Pot Drain
- Q. 1st Stage Compressor Drain
- R. 2nd Stage Compressor Drain

7 Blow-Down Receiver

- S. # 4 Foam K.O. Tank Drain
- T. # 4 Interstage Receiver Drain
- U. #3-#4-#5-#6 O₂ and Pot Drains (Headered Together)
- V. # 2 Master Mix Tank Drain

W. PVC Rec. Mono., Receiver Drain
X. Plastisol Rec. Mono-Receiver Drain
Y. #1 Cop. Foam K.O. Tank Drain
Z. "B" Fume Scrubber - Drag Out-Plastisol
AA. "A" Fume Scrubber - Drag Out-Plastisol
BB. Homopolymer Recovery System Sump Overflow
Discharge (under construction)
CC. #7 Blow-down Receiver Overflow
Discharge - (Combined Overflow)