

I.D. #82

Part 4

Lift Station Fugitive Emissions

4/19/79

By R.L. Cady

7/80 EIC

ID-1922/13

VC Plant Vents

The VCM vent was sampled before and after the scrubber during normal operations and during carbon filter regeneration toward the end of the cycle. The results during normal operations were 105 lbs/day before and 86 lbs/day after the scrubber. Scrubber water results were 121 lbs/day. Scrubber water flow was estimated at 200 gallons per minute.

During carbon filter regeneration the rate was 659 lbs/day before and 148 lbs/day after. Water effluent from the scrubber was 173 lbs/day, again with the water flow estimated at 200 gallons per minute. Clearing of the filter prior to regeneration had started at 0900 hours on 11/20/78. Final temperature was reached at 2400 hours 11/20/78. Cooling was started at 0400 hours 11/21/78. Samples were collected at 1530 hours 11/21/78 which is toward the end of the regeneration cycle so the results obtained are probably low.

Also in the VC unit, the vent off the No. 1 Lift Station of the sewer segregation system was sampled November 17 and 20, 1978. On 11/17 the vent flow was about 2 cubic feet per minute. The emission rate was 0.1 lbs/day. Water from the Lift Station was 913 ppm total ClHC with an estimated flow of 210 gallons per minute for a rate of 2,300 lbs/day. The VC scrubber effluent was in the sewer segregation system at the time of sampling.

On 11/20/78 the vent flow was 4 cubic feet per minute. Emission rate was 16.1 lbs/day. Water flow was approximately 10 gallons per minute at 985 ppm ClHC for an emission rate of 118 lbs/day total chlorinated hydrocarbons.

A summary of the tests follows. Detailed test data are included in Attachment No. 6 with the original copy of this report and is available upon request.

This includes Tri-Ethane II sump

7/10 E10
LD-1922/14

VCM Scrubber Vent

Tests Summary

Normal Operations

<u>Test Date</u>	<u>Test No.</u>	<u>Sample</u>	<u>Flow</u>	<u>CLHC</u>		
11/17/78	1	Before Scrubber	105 scfm	3,600 ppm v/v		105 lbs/day
		After Scrubber	108 scfm	3,200 ppm v/v		86 lbs/day
		Scrubber Water	200 gpm ¹	50.5 ppm wt/wt		121 lbs/day

Carbon Filter Regeneration

<u>Test Date</u>	<u>Test No.</u>	<u>Sample</u>	<u>Flow</u>	<u>CLHC</u>		
11/21/78	2	Before Scrubber	332 scfm	7,700 ppm v/v		659 lbs/day
		After Scrubber	157 scfm	3,746 ppm v/v		148 lbs/day
		Scrubber Water	200 gpm ¹	72.2 ppm wt/wt		173 lbs/day

Note: Stack Diameter -- 6"

VCM No. 1 Lift Station Vent

<u>Test Date</u>	<u>Sample</u>	<u>Flow</u>	<u>CLHC</u>		
11/17/78	L/S Vent	2.4 scfm	0.07 % v/v		0.4 lbs/day
	L/S Water	210 ¹ gpm	914 ppm wt/wt		2,300 lbs/day
11/20/78	L/S Vent	4 scfm	12,085 ppm v/v		16.1 lbs/day
	L/S Water	10 ¹ gpm	985 ppm wt/wt		118 lbs/day

Note: Stack diameter - 4".

1. Estimated Flows

PPG Industries, Inc.
Industrial Chemical Division
Lake Charles, Louisiana

Chemicals



PROCESS CALCULATIONS

Job

By APC

Date

Jan 82

Page

of

Valves, Seals, Etc Fugitive Emissions - 1982

ID# 82
Part 4

- A. Copy of Valve Count, emission factors etc used for 1981 EIQ is attached. This totaled 579 T/Yr
It was estimated that we did 75% better so:

$$1981 \text{ EIQ: } 579 \times .25 = 144.8 \text{ Tons per year}$$

- B. The 1982 EIQ part 4 items will be the same except VC-II will be added.

A copy of valve count, emission factors etc used to estimate the part 4 emissions from VC-II is attached. This totals 153 Tons per year

With the same 75% factor:

$$153 \times .25 = 38.3 \text{ T/Yr from VC-II}$$

- C.
- | | |
|------------|-----------------------------------|
| 144.8 T/Yr | from Plant B previously estimated |
| 38.3 T/Yr | from VC-II estimated for 1982 |
| 183.1 T/Yr | |

→ 1982 EIQ: 183.1 Tons per year



ID # 82
Part 4

Fugitive Emissions
VC-II for 1982 EIO (factors same as 1981)

Values

Heavy liquids 0.0007 lb/hr
Light liquids 0.023 lb/hr

Pump seals

Heavy liquids 0.045 lb/hr
Light liquids 0.26 lb/hr

Compressor seals

Heavy liquids 0.98 lb/hr
Light liquids 0.98 lb/hr

Vapor Emission Factors

VC-II
Plant Section

Classification

Counted valves from P&ID's (only)

VCM

Light Liquids

739 valves at 0.023 lb/hr x 4.38 = 74.4 Tons per year
24 pumps at 0.26 x 4.38 = 27.3
2 Comp at 0.98 x 4.38 = 8.8

Heavy Liquids

OHC-EDL Purif 1060 valves at 0.0007 lb/hr x 4.38 = 3.2
48 pumps at 0.045 x 4.38 = 9.5
2 Comp at 0.98 x 4.38 = 122.8

Heavy Liquids

Intermed. STG 461 valves at 0.0007 x 4.38 = 1.4
17 pumps at 0.045 x 4.38 = 3.3
3 Comp at 0.98 x 4.38 = 22.8

Heavy Liquids

Waste Treatment 160 valves at 0.0007 x 4.38 = 0.5
16 pumps at 0.045 x 4.38 = 3.2
0 Comp -

152.9 Tons per Year

Fugitive Emissions from Valves/Compressor Seals/Pump Seals

Vapor Emission Factors

Valves

Heavy Liquid Streams	0.0007 ^{#/hr.} ¹⁰¹⁶⁵	heavier than kerosene
Light Liquid Streams	0.023 ^{#/hr.} ^{0.552}	lighter than kerosene

Pump Seals

Heavy Liquid Streams	0.045 ^{#/hr.} ^{1.02}
Light Liquid Streams	0.26 ^{#/hr.} ^{6.24}

Compressor Seals

Heavy Liquid Streams	0.98 ^{#/hr.} ^{23.5}
Light Liquid Streams	0.98 ^{#/hr.} ^{23.5}

Plant

Classification

Estimate of values ... by

1. VC/EC/HCI

Light Liquid Streams

Dick Holiday

$$\text{#/hr.} \times 4.38 = \text{T/yr.}$$

$$3779 \text{ valves @ } 0.023 \text{ #/hr.} \times 4.38 = 380.7 \text{ T/yr.}$$

$$45 \text{ pump seals @ } 0.26 \text{ #/hr.} \times 4.38 = 51.2 \text{ T/yr.}$$

$$3 \text{ compressor seals @ } 0.98 \text{ #/hr.} \times 4.38 = 12.9 \text{ T/yr.}$$

2. OHC/Bottom

Heavy Liquid Streams

Jack Young

$$2200 \text{ valves @ } 0.0007 \text{ #/hr.} \times 4.38 = 6.9 \text{ T/yr.}$$

$$51 \text{ pump seals @ } 0.045 \text{ #/hr.} \times 4.38 = 10.3 \text{ T/yr.}$$

$$6 \text{ compressor seals @ } 0.98 \text{ #/hr.} \times 4.38 = 26.3 \text{ T/yr.}$$

3. Tetra

Heavy Liquid Streams

Jack Young

$$806 \text{ valves @ } 0.0007 \text{ #/hr.} \times 4.38 = 2.5 \text{ T/yr.}$$

$$21 \text{ pump seals @ } 0.045 \text{ #/hr.} \times 4.38 = 4.1 \text{ T/yr.}$$

$$1 \text{ compressor seal @ } 0.98 \text{ #/hr.} \times 4.38 = 4.3 \text{ T/yr.}$$

(cont'd)

Plant	Classification	Estimator of valves...	by
4. Tri-E II / OHC II	Heavy Liquid Streams		Mastafa Kamal
4200 valves @ $0.0007 \text{ #/hr.} \times 4.38 = 12.97 \text{ T/yr.}$			
82 pump seals @ $0.045 \text{ #/hr.} \times 4.38 = 16.4 \text{ T/yr.}$			
2 compressor seals @ $0.98 \text{ #/hr.} \times 4.38 = 8.6 \text{ T/yr.}$			
5. Per / Tri	Heavy Liquid Streams		Kirk Ezelle
4300 valves @ $0.0007 \text{ #/hr.} \times 4.38 = 13.2 \text{ T/yr.}$			
65 pump seals @ $0.045 \text{ #/hr.} \times 4.38 = 12.8 \text{ T/yr.}$			
6. EDC / VDCM II	Heavy Liquid Streams		Larry Burden
525 valves @ $0.0007 \text{ #/hr.} \times 4.38 = 1.8 \text{ T/yr.}$			
63 pump seals @ $0.045 \text{ #/hr.} \times 4.38 = 12.4 \text{ T/yr.}$			
7. Dock Storage	Heavy Liquid Streams		Frank Wilkinson
35 valves @ $0.0007 \text{ #/hr.} \times 4.38 = 0.11 \text{ T/yr.}$			
8 pump seals @ $0.045 \text{ #/hr.} \times 4.38 = 1.6 \text{ T/yr.}$			

Total = 579 T/yr.

- It was estimated that we are 75% better than the vapor emission factors used in the calculations.

$$579 \text{ T/yr} \times 0.25 = 144.8 \text{ T/yr.}$$

TABLE 3-3. PROCESS STREAM CLASSIFICATION BY GROUP

<u>STREAM GROUP¹</u>	<u>HYDROCARBON STREAM DESCRIPTION²</u>
Gas/Vapor	C ₁ -C ₂ Hydrocarbons C ₃ -C ₄ Hydrocarbons C ₅ -C ₉ Hydrocarbons C ₁₀ + Hydrocarbons Mixed Molecular Weight Hydrocarbon Streams Aromatic Hydrocarbons Miscellaneous Organic Compounds Hydrocarbon Streams Containing H ₂ , H ₂ S, and H ₂ O
Light Liquids/Two-Phase	C ₂ Hydrocarbons C ₃ -C ₄ Hydrocarbons C ₅ -C ₆ Hydrocarbons C ₇ -C ₉ Hydrocarbons Naphtha Light Distillate Aromatic Hydrocarbons (low molecular weight) Miscellaneous Streams
Heavy Liquids	Kerosene, Diesel, Heating Oil Gas Oils Atmospheric Resid/Vacuum Gas Oil Vacuum Resid/Asphalt Aromatics/Polymers Mixed Molecular Weight Streams Non-distillate Solvents Miscellaneous Organic Streams

¹Stream group is determined by the stream conditions within the process lines

²The most volatile stream component present at a concentration of 20% or more determines the stream classification.

TABLE 4-2. SUMMARY STATISTICS AND ESTIMATED VAPOR EMISSION FACTORS
FOR NONMETHANE HYDROCARBONS FROM BAGGABLE SOURCES

SOURCE TYPE	TOTAL SCREENED ¹	NUMBER LEAKING ²	PERCENT LEAKING	95% CONFIDENCE INTERVAL FOR PERCENT LEAKING	PERCENTILE FOR INDIVIDUAL LEAKS (lbs/hr)		EMISSION FACTOR ESTIMATE (lbs/hr-source)	95% CONFIDENCE INTERVAL FOR EMISSION FACTOR (lbs/hr-source)	EMISSION FACTOR PERCENTILE
					1st	99th			
VALVES									
Gas/Vapor Streams	683	200	29.3	(25.9 , 32.7)	0	0.61	0.047	(0.027 , 0.084)	94.4
Light Liquid/Two-Phase Streams	1019	372	36.5	(33.6 , 39.5)	0	0.31	0.023	(0.016 , 0.034)	89.7
Heavy Liquid Streams	522	35	6.7	(4.6 , 8.9)	0	0.08	0.0007	(0.0002 , 0.002)	95.8
PUMP SEALS									
Light Liquid Streams	470	300	63.8	(58.9 , 68.8)	0	4.0	0.26	(0.17 , 0.39)	89.8
Heavy Liquid Streams	292	66	22.6	(17.1 , 28.1)	0	0.87	0.045	(0.02 , 0.11)	86.4
FLANGES (ALL)									
	2030	62	3.1	(2.2 , 3.9)	0	0.008	0.00058	(0.0002 , 0.001)	97.4
Gas/Vapor Streams	369	10	2.7	(0.8 , 4.6)	0	0.008	0.0005	(10 ⁻¹ , 0.005)	
Light Liquid/Two-Phase Streams	616	33	5.4	(3.3 , 7.4)	0	0.011	0.0005	(0.0002 , 0.001)	
Heavy Liquid Streams	325	6	1.9	(0.2 , 3.5)	0	0.009	0.0007	(10 ⁻¹ , 0.02)	
COMPRESSOR SEALS									
Hydrocarbon Service	145	102	70.3	(62.9 , 77.7)	0	17.0	0.98	(0.46 , 2.0)	83.4
Hydrogen Service	85	69	81.2	(71.2 , 88.8)	0	2.0	0.10	(0.04 , 0.24)	86.5
DRAINS (ALL)									
	255	49	19.2	(14.4 , 24.0)	0	1.3	0.070	(0.02 , 0.20)	93.3
Light Liquid/Two Phase Streams	100	26	26.0	(14.6 , 37.4)	0	1.9	0.085	(0.02 , 0.32)	
Heavy Liquid Streams	107	19	17.8	(9.5 , 26.1)	0	0.63	0.029	(0.003 , 0.21)	
RELIEF VALVES (ALL)									
	148	58	39.2	(25.1 , 40.6)	0	4.9	0.19	(0.06 , 0.52)	91.9
Gas/Vapor Streams	92	42	45.6	(35.2 , 56.4)	0	4.0	0.36	(0.10 , 1.30)	
Light Liquid/Two Phase Streams	28	7	25.0	(10.7 , 44.9)	0	0.38	0.013	(0.001 , 0.23)	
Heavy Liquid Streams	23	8	34.8	(16.4 , 57.3)	0	0.42	0.019	(0.001 , 0.20)	

¹Some streams could not be accurately classified into stream category so the totals are not the sum of the stream groups.

²Leaking sources in this report are defined as sources with screening values greater than or equal to 200 ppmv or sources with measured leaks greater than 0.00001 lbs/hr.