



TO P. S. Trew DATE November 18, 1983
FROM M. K. Davis/E. Liggio SUBJECT Evaluation of the Emission
Inventory Questionnaire

Attached is the information concerning Plant 'B' stack emissions requested by the Environmental Department. This information is based on 1981 operations reports. Flows reported in 1981 were compared to more recent operations reports and little change was noted; therefore, the flows were not revised. The information concerning vent compositions was taken from LD-2044. The ethylene compositions were altered in several cases to more accurately reflect current plant operation. It should be noted that the LP EDC III and OHC I units have been included for emission purposes, but these plants are not operational at this time.

The summary table attached reflects the flow rates and composition of the vents to the scrubbers and not actual stack emissions. This was necessary because there is little information available on actual stack flow rates and compositions.

To determine the total time organics are vented to the scrubber, the following assumptions were made:

- 1) organics vent to the scrubber for one-half hour during both LP EDC and OHC reactor shutdowns.
- 2) organics vent to the scrubber for one hour during start-up of all reactors except for LP EDC IV. A two hour start-up time was used for this unit.

If there are any questions concerning any of the information provided, contact Mel Davis or Esther Liggio.

/vem

PLANT 'B'
VENT COMPOSITIONS

WEIGHT %

<u>Component</u>	<u>LP-I</u>	<u>LP-II</u>	<u>LP-III</u>	<u>LP-IV</u>	<u>OHC-I</u>	<u>OHC-II</u>	<u>OHC-III</u>
N ₂	0.98	11.06	-	7.5	5.4	11.08	11.32
O ₂	1.81*	5.85*	-	3.77*	2.4*	2.1*	-
C ₂ H ₄	57.27	16.28	34.09	27.51	29.1	23.33	23.86
CO ₂	20.5	11.41	0.89	9.09	42.8	48.11	49.17
CH ₄	0.19	8.25	1.4	1.18	0.11	0.14	0.14
C ₂ H ₆	8.96	2.48	2.98	2.91	0.23	0.16	0.17
HCl	1.95	9.34	48.48	39.07	-	-	-
VCM	-	-	-	-	0.98	1.12	1.12
EC	4.44	14.26	8.10	4.57	1.55	3.07	3.14
H ₂ O	-	-	-	-	0.62	0.58	0.6
1,2 EDC	3.87	20.72	4.05	2.93	9.62	4.09	4.14
Cis-DCE	-	-	-	-	0.12	-	-
Trans-DCE	-	-	-	-	0.18	0.22	0.23
CHCl ₃	0.23	0.29	-	-	2.5	0.72	0.71
CO	-	-	-	0.58	3.75	4.73	4.84
MeCl	-	-	-	-	0.33	0.44	0.44
CCl ₄	-	-	-	-	0.28	-	-

* Includes argon

SUBJECT Plant 'B' - Summary of Plant Vents to Scrubber

	LP I	LP II	LP III	LP IV	OHC I	OHC II	OHC III
Average Vent Flow to Incinerator MSCF/day	25.88	157.37	55.18	48.0	277.98	145.83	168.0
Average Molecular Weight #/mole	36.31	50.11	40.0	37.19	45.62	41.1	43.21
% VOC organics	74.96	62.32	50.62	39.98	45.08	33.35	34.01
Average Organics Flow to Incinerator MSCF/day	19.4	98.07	27.93	19.19	125.31	48.63	57.14
Total time organics are vented to scrubber hrs/day	0.057	0.033	0.0375	0.151	0.215	0.05	0.16
Venting to scrubber due to startup Average hrs/day	0.038	0.022	0.025	0.121	0.143	0.033	0.107
Venting to scrubber due to emerg. losses Average hrs/day	0.019	0.011	0.0125	0.03	0.072	0.017	0.053
Total organics vented to scrubber Average #/hr	0.18	0.743	0.192	0.494	5.63	0.458	1.809
Total organics vented to scrubbers-startups Average #/hr	0.12	0.495	0.128	0.396	3.74	0.302	1.21
Total organics vented to scrubber due to emergency losses Average #/hr	0.06	0.248	0.064	0.096	1.89	0.156	0.599

$$\text{Average \# / hr} = \frac{(\text{SCF/day})(\text{hrs. vented/day})(\text{MW \# / mole})}{(24 \text{ hrs/day})(24 \text{ hrs/day})(379 \text{ SCF/mole})}$$

SUBJECT REACTOR STARTUP / SHUTDOWN EMISSIONS SAMPLE CALCULATIONS

EDC I :

AVERAGE ORGANICS FLOW TO INCINERATOR :

$$\text{AVG. ORG. FLOW TO INC.} = 25.88 \frac{\text{MSCF VENT.}}{\text{DAY}} \times \frac{.7496 \text{ MOLE ORG.}}{\text{MOLE VENT}} = 19.4 \frac{\text{MSCF ORG}}{\text{DAY}}$$

THE TOTAL TIME ORGANICS ARE VENTED TO THE SCRUBBER IS OBTAINED FROM OPERATIONS REPORTS AND OPERATIONS PERSONNEL. THE NUMBER IS REPORTED AS HRS/DAY AND IS AVERAGED OUT OVER THE YEAR. SIMILARLY, THE VENTING TIMES DUE TO STARTUP AND EMERGENCY LOSSES ARE OBTAINED. THE STARTUP AND EMERGENCY LOSSES NUMBERS SUM TO THE TOTAL TIME ORGANICS ARE VENTED TO THE SCRUBBER.

TOTAL ORGANICS TO SCRUBBER (AVERAGE #/HR) :

$$\frac{\text{AVG. \#}}{\text{HR}} = \frac{(\text{SCF/DAY})(\text{HRS VENTED/DAY})(\text{MW \#/MOLE})}{(24 \text{ HR/DAY})^2 (379 \text{ SCF/MOLE})}$$

THE ABOVE EQUATION APPEARS AT THE BOTTOM OF THE SUMMARY TABLE.

$$\frac{\text{AVG. \#}}{\text{HR}} = \frac{19.4 \text{ E3 SCF}}{\text{DAY}} \times \frac{\text{DAY}}{24 \text{ HR}} \times \frac{0.057 \text{ HR}}{\text{DAY}} \times \frac{\text{DAY}}{24 \text{ HR}} \times \frac{36.31 \text{ \#}}{\text{MOLE}} \times \frac{\text{MOLE}}{379 \text{ SCF}}$$

T_R = 59°F

$$= 0.18$$

THE TOTAL VENTED DUE TO STARTUPS AND EMERGENCY LOSSES (AVERAGE #/HR) ARE SIMILARLY OBTAINED. THEY SUM TO TOTAL ORGANICS TO SCRUBBER.