Monsanto

FROM (NAME & LOCATION) E. E. Stewart, Krummrich Plant

DATE : May 10, 1972 cc: Art Leisy

SUBJECT : PCB - LOSS CONTROL
OFF-GAS SCRUBBING

REFERENCE :

TO : Messrs.
Ken Boucher
Bill Engman
Linus Horcher
Dan Lynch
Ed Stewart
Neil Thompson

The addressees met 5/5 to review the laboratory data related to off-gas scrubbing experiments currently being run in the laboratory. The objective of the laboratory runs is to provide data that can be used to design an off-gas scrubber that can be installed in the plant to remove PCB's from the HCl off-gas from the Aroclor department. PCB's will be defined for this memo as all chlorinated biphenyls including the mono chlorinated biphenyls.

I. We will use the following PCB levels as a guideline to evaluate various scrubbing media.

Daily PCB loss in the off-gas	Maximum PCB permitted in the off-gas Maximum Production Rate ( )	Average Production Rate
2.5 #/day (1)	21 ppm	47 ppm
1.0 #/day (1)	8	18
0.5 #/day (1)	4	9
0.05 #/day (2)	0.4	0.9

(1) Would assume an additional 0.5 #/day from rest of Aroclor department, the Incinerator and the Rip Track area.

(2) Assume 0.05 #/day from rest of Aroclor Department, the Incinerator and the Rip Track area.

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II. Approximately 40 laboratory off-gas scrubbing experiments were run by passing HCl through various PCB mixtures, scrubbing the resultant HCl-PCB mixture with different scrubbing media in Oldershaw columns and then analyzing the scrubbed HCl gas to determine residual PCB content.

Resultant PCB's in the HCl gas scrubbed by various media from some of the data are tabulated below. Results were corrected to 40°C by assuming there is a two-fold change per 10°C change in temperature. Each grouping refers to a particular scrubbing liquid.

OXYALCOHOL

24 ppm @ 25°C

HB 40

6 ppm @ 25°C	(18)
2 ppm @ 25°C	(6)
6 ppm @ 25°C	(18)
9 ppm @ 25°C	(27)
	(17 ave.)

HB 40 and CARBON

0.7 ppm @ 25°C

1242

2 ppm @ 25°C	(6)
12 ppm @ 25°C	(36)
12 ppm @ 25°C	(36)
53 ppm	
8 ppm @ 25°C	(24)
20 ppm @ 40°C	(20)
	(24 ave.)

1242/1254

4 ppm @ 25°C (17)

1242 and CARBON

1 ppm @ 25°C
0.4 ppm @ 25°C
3 ppm @ 25°C

OFF GAS CONDENSATE

22 ppm @ 25°C
8 ppm
17 ppm
10 ppm
20 ppm @ 40°C
23 ppm @ 40°C

(17 ave.)

1016 DISTILLED BOTTOMS

38 ppm @ 40°C	(38)
18 ppm @ 40°C	(18)
6 ppm @ 40°C	(6)
28 ppm @ 40°C	(28)
22 ppm @ 40-50°C	(22)
7 ppm @ 38°C	(8)
17 ppm @ 58°C	(4)
20 ppm @ 60°C	(5)
	(16 ave.)

1109

2 ppm

CARBON

8 ppm

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Amounts of PCB present obtained from calculation based on PCB content as measured by control lab using method for PCB analysis in sewer streams. This method does not detect the mono chloro biphenyls present. To all of the above numbers the amount of mono present would have to be added. This is especially true for the off-gas scrubbed with off-gas condensate, 1242 and 1109.

Additional data was presented that indicated PCB's scrubbed with C/S could reduce PCB content to 1-5 ppm range. More testing to be done.

III. Possible scrubbing systems to meet various levels are:

Daily PCB loss in the off-gas	Scrubbing Liquid
2.5 #/day	1016 Distilled Bottoms HB 40
1.0 #/day	Possibly 1016 Distilled Bottoms HB 40
0.5 #/day	Carbon 1016 or HB 40 plus Carbon
0.05 #/day	Carbon Possibly C/S 1016 or HB 40 plus carbon or C/S

IV. Additional information required

A. Lab runs using 5, 10 and 15 plate Oldershaw column using C/S acid needed to design plant C/S scrubber.

B. Analyze off-gas taken from Dept. 217 where a C/S packed tower and demister are present in off-gas line to C/S reactor. Make three runs.

C. Analyze off-gas from Dept. 246 using combined analysis of control section for higher PCB's and Linus Horcher's method to determine mono.

IV. Additional information required

D. Incorporate present thinking and off-gas scrubbing possibilities into thinking related to future adiabatic absorber. May want to locate adiabatic absorber at Dept. 217.

Next review meeting to be held 5/11/72 @ 3:00 P.M. in Lab Conference Room.

E. E. Stewart
Technical Services Department

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