Monsanto

FROM (NAME & LOCATION) W. B. Papageorge - B1ND

DATE May 3, 1974

SUBJECT Toxic Pollutant Effluent Standards

REFERENCE

CC A. J. Koenig - B2SK
J. R. Savage - B2SL

TO : [redacted] S. Bergen - B2SL
W. R. Corey - B2SL
D. B. Hosmer - E1SF
P. S. Park - B2SA

Attached is a copy of questions which EPA counsel may raise during the PCB hearings next week, and a draft of possible responses assembled by Jim Savage and Art Koenig. I do not propose that the answers be typed and submitted as a report to EPA. I do believe, however, that we should be prepared with appropriate answers in the event the questions are asked.

We will meet in Room B-274-S at 2:00 pm., Monday, May 6, 1974, for discussion.

W B Papageorge

W. B. Papageorge

WBP:cs
Attachments

0042827

EX P-3097
Page 1 of 13

PCB-ARCH0748157

DRAFT

"General Economic Questions"

Answers to EPA:

1) - Location of PCB Production Plant - Sauget, Illinois

- Production Capacity - 55-60MM lb/yr.

- Shipments - 30-50MM lb/yr. during last 3 years

- Employment - 25-30 persons directly employed and 30 others in support functions. Intermediate unit involves 47 employees

- Supplementary Points:

  - The PCB Unit is one component of a large complex, the W. G. Krummrich Plant, employing over 1,000 persons.

  - We formerly had a second PCB Production Plant of comparable size at Anniston, Alabama, and total shipments were approximately 100MM lb/yr. prior to discontinuance of "open System" applications.

2 & 3) There are two areas in the Plant which are currently involved in handling PCB's. These are the Production Unit and the Incinerator. The following flows apply to those two areas; water flow for the complex is much larger, but the remainder originates in areas unrelated to PCB's.

	(Thousands of Gallons Per Day) PCB Production Area	Incinerator
Average	245	190
Low	100	14
High	500	250
Per Unit Produced	2.25 gal/lb.	-

Does not include rain run off

PCB-ARCH0748158

4) Discharge from the units involved is to the general sewer system of the complex, thence to the Sauget Village Treatment Plant which discharges to the Mississippi River at mile 178.1 above the Ohio. The following data is from the U.S. Geological Survey for St. Louis mile 180.0:

Average flow	174,500	cubic feet per second (111 years)
Minimum flow 1972	68,600	cubic feet per second gage 0.08 ft.
Maximum flow 1972	408,000	cubic feet per second gage 25.00 ft.
Minimum recorded flow	18,000	cubic feet per second gage - 6.1 ft.
Maximum recorded flow	1,019,000	cubic feet per second gage +38.00 ft.

At this point the river is 1600 feet wide and varies in depth from 15 to 25 feet at zero gage. The average flow represents a gage height around 11 feet.

- Ambient concentration of PCB's - Because the river is so large compared to PCB discharges, no serious attempt has been measure ambient level. The following spot samples support the contention that such a program would be fruitless:

Date	Location	PCB's mg/l.	PCB's ppb
10/30/72	Jefferson Baracks Bridge (Below Plant)	<0.0001	<0.10
12/13/72	Chain of Rocks Bridge (Above Plant)	0.00022	0.22
12/12/72	N. of Ill. River (Above C.O.R. Bridge)	0.00019	0.19

5) -Source of the Pollutant - The manufacture of PCB's involves no direct contact of water with the product stream. However, water is used in the process for indirect cooling and quenching the exhaust of stream ejectors for process vacuum. There is also a scrubber on a small air

PCB-ARCH0748159

stream containing HCl which is contaminated with small amounts of PCB's. Any leaks or spills are contained by a system of curbs and sumps, but the slight solubility of PCB's in water allows some of any such spill to reach the sewer.

In the incinerator area, the hot flue gas from the incinerator is quenched and scrubbed with water to remove HCl and the water is sewered. Firebox operating conditions are controlled to prevent any PCB's from reaching the water stream; the small amount of PCB's in the effluent from the area is believed to result from runoff from leaking drums of returned product which have been encountered in the past.

6) -Substitutes for the Pollutant - Not really a relevant question, since the purpose of these facilities is manufacture of PCB's. Monsanto is working toward replacement products but it is most unlikely that any such product could be manufactured in this equipment.

7) -Estimated Treatment Cost - No treatment technology has been developed to the point that a commercial installation could be confidently designed to reach proposed effluent requirements, therefore the following data describes a conceptual approach.

Capital - $300,000 each for two systems, does not include incinerator ($800,000)

O & M - $120,000 - $150,000/yr.

Annual - Assume a ten year writeoff - $180,000-$210,000 per year.

8) -Cost of Abatement - about 0.5¢/lb. if proven feasible.

9) -Profitability slightly better than average for the chemical industry.

Annual sales - about 10\overline{M}$

Value of Assets - 11\overline{M}$

Cash Flow - $1 - 2\overline{M}$

Capital Expenditures under 0.5\overline{M}$/yr.

10) -Ability to raise prices is controlled by cost performance in applications.

Only truly competitive products would be imported PCB's.

Discharge at our producing unit would be eliminated, however, control at user's plants would still be required.

Plant closure criteria include recovery of cost of capital and allowance for small margin for risk factors.

No salvage value is predicted. Cost of decontamination and proper disposal will generate costs not normally encountered in dismantling idle facilities. Ability to raise capital, cost of capital, etc., are all influenced by conditions prevalent at the time capital is required.

ATTACHMENT A

General Economic Questions

For each plant:

(1) location, production capacity, annual shipments, and employment

(2) total water usage
- quantity per day
- quantity per unit of production
- give both the average and the range

(3) water usage for only those waste streams containing the pollutant in question
- quantity per day
- quantity per unit of production
- give both the average and the range

(4) receiving water body data (stream flow, lake size, etc.) at the point of discharge
- ambient concentration of the pollutant (upstream and downstream)

(5) source of the pollutant (part of the process, contaminant in raw materials, etc.)

(6) substitutes for the pollutant (process changes, less contaminated raw materials, etc.)
- are there process changes, less contam. raw mat., etc, which will reduce pollutant load?

(7) estimated treatment costs
- investment
- O & M
- annual (investment plus O & M)

(8) cost of abatement
- estimated treatment costs per unit of production
- cost of substitutes (see (6)) alternative processes or raw materials.

(9) financial data
- profitability on investment and sales
- annual sales
- value of assets (fixed and current)
- cash flow
- capital expenditures

PCB-ARCH0748162

(10) economic impact
- ability to raise prices
- price of competitive products (including imports)
- availability of competitive products (including imports)
- threat of plant closure
- criteria for closure
- cutoff in profitability, cash flow, etc. below which the plant will close
- salvage value of the plant
- ability to raise capital
- how would this investment be financed (debt, equity, pollution control bonds, etc.)
- the cost of capital
- period of repayment
- planned capital expenditures over the period of repayment

5-6-74

- General Economic Questions -

1). Employment: 75 to 100

The PCB department is one unit included in a large chemical complex, the Wm G. Krummrich Plant, in which approximately 100 products are manufactured.

We formerly had a second PCB department of comparable size at Anniston Alabama. Total shipments were approximately 100 MM pounds per year with both depts in operation. We shut down the Anniston unit when we voluntarily discontinued sales of PCB's for open system applications.

2) Total water usage in the Sauget Plant Complex is 8,000,000 to 10,000,000 gals/day, or 144 to 18 cuft/sec. Influent to the Sauget primary treatment plant is 16,000,000 to 20,000,000 gallons/day or 28.8 to 36 cuft/sec

PCB-ARCH0748164

86,400 sec/day 60 / 60 / 24 / 86400 sec/day.

3.) There are two areas in the plant where PCB's are processed. These are the production department and the used PCB incinerator. The following flows apply to these areas.

gals .1337 ft³

	PCB Production Area			Incinerator
Average	0.37	cu ft/sec	245,000 gals/day	0.285 cu ft/sec 190,000 gals/day
Low	0.15	"	100,000 gals/day	0.021 14,000 gals/day
High	0.75	"	500,000 gals/day	0.375 cu ft/sec 250,000 gals/day

Usage/unit produced 2.25 gals/#.

All aqueous effluents are processed in one sewer system

245,000 × .1337 = 38122 / 86,400 = .0000015

4.) Discharge from the units involved is to the process plant sewer system of the complex thence to the Sauget Village Treatment Plant which discharges to the Mississippi River at mile 178.1 above the Ohio. The following data is from the U.S. Geological Survey for St Louis mile 180.0

7.481 gals/ft
86,400
646 3584

Receiving water body data:

— Mississippi River —

Average flow	174,500 cu ft/sec (111 yrs)	111,044,540,880 gal/d
Minimum flow 1972	68,600 cu ft/sec gage 0.08 ft	43,654,186,240 "
Maximum flow 1972	408,000 cu ft/sec gage 25.0 ft	259,634,227,200 "
Minimum recorded flow	18,000 cu ft/sec gage -6.1 ft	11,451,744,200 "
Maximum recorded flow	1,019,000 cu ft/sec gage 38.0 ft	648,449,209,600 "

at point of discharge the Mississippi River is 1600 ft wide and varies in depth from 15 to 25 ft at o gage. The average flow represents a gage height of 25 ft.

The total aqueous effluent from the PCB manufacturing department flows the increments is shown below as a percentage of Mississippi River flow

Average $\frac{0.37 \times 100}{174,500} = 0.00027\%$

Low $\frac{0.15 \times 100}{68,600} = 0.00027\%$

High $\frac{0.75 \times 100}{1,019,000} = 0.00007\%$

PCB-ARCH0748166

5). The manufacture of PCB's involves the use of no direct contact process water. Non process waste water is used for quenching the exhaust of steam ejectors equipped with barometric condensers. There is also a scrubber used to treat a small stream of air containing HCl gas plus minor PCB contaminant. The entire department and the incinerator are enclosed by a system of curbs and sumps to prevent losses from leaks, spills or PCB's contained in non process waste water. The slight solubility of PCB's in water does however permit some product to escape to the plant sewer system.

In the incinerator area there is open drainage.

b) Research work has been conducted for many years by numerous companies searching for a product which is superior to PCB's. No successful results have been achieved to date. Monsanto has continued to work towards an acceptable replacement product but its discovery seems unlikely at this time.

We have spent in excess of 20 man years of engineering time during the last 4 or 5 years modifying the product, its equipment, and materials containment facilities. This work has lead to substantial reductions in emissions and more work is planned.

We have even modified our shipping containers to minimize leakage at an added cost of $30,000/yr. for these items.

Primary Treatment - $ 400,000

Chemical Treatment - $ 6,000,000

Regional Treatment - $ 36,000,000

$ 42,400,000

In dept treatment

INCINERATOR $ 790,000

Bath Tub $ 210,000

Change Product Mix (1016) $ 1,000,000

Scrubber $ 75,000

$ 2,075,000

20 man years:

Heavier Drums:- 18 30 M/yr.

PCB-ARCH0748169