R. K. McCutchan

J. J. Burbage - GO
C. P. Cunningham - GO
W. R. Corey - GO
H. S. Bergen - GO
C. D. Culberson - GO
R. J. Kozacka - GO
C. W. Roos - GO
G. L. Bratsch - GO

MONSANTO INDUSTRIAL CHEMICALS COMPANY

APPROPRIATION REQUEST

November 6, 1972

TO: C. P. Cunningham
Managing Director

FUNCTIONAL PRODUCT GROUPS

SPECIALTY PRODUCTS BUSINESS GROUP

W. G. KRUMMRICH PLANT

REQUEST NO. 8020

TITLE: Aroclors - Install PCB Off-Gas Scrubber

New Fixed Capital $73,000

A. E. Leisy

A. E. Leisy, General Superintendent

G. L. Bratsch 11/10/72

G. L. Bratsch, Plant Manager

DWM

Approved:

H. S. Bergen, Business Director

W. R. Corey, Group Director

C. P. Cunningham, Managing Director

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FINANCIAL SUMMARY ($M)

New Fixed Capital	$73
Additional Investment	0
Gross Investment	$73
Expenses:	
Start-Up	$ 0
Dismantling	0
Retirement Loss	0
Modifications	4
Repairs	0
Total Expense	$ 4

After-Tax Income Non-Earnings ($13.8/yr.)
Additional Operating Costs

I. BACKGROUND AND NEED FOR PROJECT

At present, the HCl off-gas from the chlorination process step in the production of Aroclor contains about 15-30 pounds of poly-chlorinated biphenyls(PCB's) per day. The HCl off-gas flows to the chlorosulfonic acid department where chlorosulfonic acid is produced. PCB's in the off-gas are essentially converted to sulfonyl chloride by passing through a scrubber at the acid department. Organics formed in the scrubber are sewered.

Production in the Aroclor and the chlorosulfonic acid departments must be balanced such that excess HCl off-gas from the Aroclor department which contains PCB's not be sewered. The Aroclor operation must be shut down or reduced when chlorosulfonic operations are shut down or reduced because the plant has adopted the policy not to intentionally discharge PCB's into the environment via off-gas sewering into the plant sewer system.

During the past nine months it has been possible to coordinate operations between the Aroclor and chlorosulfonic operations because chlorosulfonic operations required more HCl off-gas than was being generated in the Aroclor department. However, the present daily balance is so close it is becoming difficult to operate so as not to sewer off-gas containing PCB in the Aroclor department. In 1973 and 1974 the balance between departments is estimated at 7 and 3% margin of C/S over Aroclor respectively. This compares with a margin of 17% during the past nine months. Seasonal and daily operating imbalances in the respective departments could magnify the average difference, and it is estimated that about 10% of the Aroclor off-gas containing PCB's will have to be sewered when Aroclor demands would be required to satisfy customer requirements.

I. BACKGROUND AND NEED FOR PROJECT(Cont'd.)

Although no regulation exists at present we believe the Federal Environmental Protective Agency will establish a guideline which will limit PCB in any receiving water stream at 0.01 ppb PCB. One pound of PCB from the department is equivalent to about 0.001 ppb in the Mississippi River.

Sewering off-gas containing 15-30# PCB per day when not producing chlorosulfonic acid would exceed the expected EPA guidelines, and Aroclor operations could not be continued with such an environmental discharge of PCB to the sewer.

This project would provide HCl off-gas scrubbing facilities in the Aroclor department where the PCB content of the HCl off-gas could be reduced to an average value of about 2.5# PCB per day. The Aroclor department could operate independent of chlorosulfonic acid operations. When HCl off-gas would not be required for chlorosulfonic acid production, the scrubbed off-gas from the Aroclor department could be sewered. The amount of PCB discharged to the sewer would be within the expected EPA guideline of 0.01 ppb PCB in the receiving water(Mississippi River).

II. DESCRIPTION OF PROJECT

This project would provide HCl off-gas scrubbing facilities in the Aroclor department. A 15 plate valve tray column is to be provided with auxiliary scrubber liquor circulating tank and pump. Distilled residue liquor containing the higher chlorinated, low vapor pressure PCB's will serve as the scrubbing liquor. The spent scrubber liquor will be returned to the process for total recycle.

Scrubbed HCl off-gas would flow to the chlorosulfonic acid department, the adiabatic absorber for muriatic production(project in preparation) or to the sewer.

III. PROFITABILITY

This is a non-earnings project. This project is related to controlling the entrance of PCB's into the environment during periods of production imbalance between the Aroclor and Chlorosulfonic Acid departments.

Additional operating costs are $13.8M/yr.

Utilities	$ 1,865/yr.
Repairs	4,000
Laboratory	600
Depreciation	6,100
Factory Indirect Expenses	1,275
	$13,840/yr.

Budget Aroclor production requirements in 1973 are 36.8M lbs. Failure to supply 10% of this amount during periods of imbalanced operations would not only jeopardize customer relations, it could also result in a loss of gross profits of $300,000.

IV. ALTERNATE COURSES

Alternate courses that have been considered are:

I. Continue as is by operating Aroclor department in balance with chlorosulfonic acid department. Off-gas passes through scrubber at chlorosulfonic department.

Advantages:	No capital required and PCB discharge to sewer at Aroclor department in compliance with expected EPA guidelines.
Disadvantages:	Aroclor operation dependent on and limited by chlorosulfonic operation. Potential problems with EPA could develop when needs were such that Aroclor had to operate to meet sales and chlorosulfonic department could not operate. During past six months the Aroclor department was idle about 25% of the time due to no HCl outlet.

II. Carbon treat HCl off-gas in gaseous phase

Advantages:	Could further reduce PCB content of off-gas to essentially zero.,
Disadvantages:	More costly and exact process not defined.

III. Install required instrumentation and sewering facilities at the chlorosulfonic department to permit sewering excess HCl off-gas(after scrubbing).

Advantages:	Short term needs would be satisfied with expenditure of about $20,000. Losses would be same as present and within expected EPA guideline.
Disadvantages:	Short term only wherein form of PCB is being changed to a sulfonyl chloride which is sewered. We would probably eventually be restricted from sewering derivatives of PCB. Also, does not fit into program of respective clean up prior to sending gas to a plant adiabatic absorber. Control of unit is in department apart from Aroclor operations.

The above three alternates are not recommended.

V. CAPITAL ESTIMATE

The estimate is based on installation with plant people. Major equipment cost based on equipment manufacturer's quotation.

Proposed facilities can be installed within six months of approval. Expect to have in operation by 7/1/73.

Project has been reviewed with the Corporate Engineering Department.

VI. PERSONNEL

No personnel changes are involved.

VII. POLLUTION AND TOXICITY PROBLEMS

This is a pollution control project. It is a part of the WGK strategy to continue Aroclor production at the W. G. Krummrich Plant indefinitely in such a manner to restrict knowing discharges from the manufacturing department to the lowest technical achievable level.

Reduction of PCB's in the off-gas to essentially zero would be desirable. Based on limited laboratory data it appears that achieving this goal might be technically feasible, however, the economics at this time might not justify such action. Any additional PCB removal facilities beyond what is considered in this project would require this scrubber as a first step in the clean up facilities.

VIII. PRODUCTION RISKS AND HAZARDS

This project will not affect the fire or explosion hazards in the department.

IX. PATENT PROBLEMS

Does not apply.

X. LEGAL

Does not apply.

XI. PHYSICAL DISTRIBUTION

Does not apply.

XII. SUPPORTING SCHEDULES

Project authority for expenditure.

Prepared by: Edward E. Stewart

Edward E. Stewart
Technical Services Department

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cc: G. Hippe B. Eden
L. Sprandel G. Newman

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