

ILLINOIS POLLUTION CONTROL BOARD  
May 22, 1975

STEPAN CHEMICAL COMPANY,                    )  
    Petitioner,                                )  
  )  
    v.   )     PCB 74-425  
  )  
ENVIRONMENTAL PROTECTION AGENCY,        )  
    Respondent.                               )

OPINION AND ORDER OF THE BOARD (by Mr. Goodman):

This matter comes before the Pollution Control Board (Board) upon Stepan Chemical Company's (Stepan) petition for a variance authorizing the discharge of carbon monoxide from Stepan's phthalic anhydride production at Stepan's Millsdale Plant in excess of the limits set by Rule 206(c) of the State of Illinois Air Pollution Regulations. Rule 206(c) states:

Petroleum and Petrochemical Processes. No person shall cause or allow the emission of a carbon monoxide waste gas stream into the atmosphere from a petroleum or petrochemical process unless such waste gas stream is burned in a direct flame afterburner or carbon monoxide boiler so that the resulting concentration of carbon monoxide in such waste gas stream is less than or equal to 200 ppm corrected to 50 per cent excess air, or such waste gas stream is controlled by other equivalent air pollution control equipment approved by the Agency according to the provisions of Part 1 of this Chapter.

The ambient air quality standards for carbon monoxide as promulgated by Rule 310 of Chapter 2 of the Air Pollution Regulations are:

- (1) a maximum 8-hour concentration not to be exceeded more than once per year of 10 milligrams per cubic meter (9 ppm); and
- (2) a maximum 1-hour concentration not to be exceeded more than once per year of 40 milligrams per cubic meter (35 ppm).

Stepan's Millsdale plant, located on the Des Plaines River in Will County, produces phthalic anhydride, liquid detergent intermediaries, dry cleaning emulsifiers, poly-methane foam systems and high purity specialties for the

cosmetic industry. The focus of Stepan's petition is on its phthalic anhydride facilities, a basic industrial chemical used in the manufacture of paints and coatings, pharmaceuticals, resins and plastics. Stepan's phthalic anhydride plant is one of two in Illinois and is the principal source of supply for 11 companies in Illinois which purchase 10,000,000 pounds per year from Stepan.

The phthalic anhydride process consists of the reaction of orthoxylene with oxygen to produce phthalic anhydride which is condensed, fractionated and sold as liquid or flaked material. The waste gases are disposed through a 75 foot stack. The CO concentration in the emission is approximately 5000 ppm and is emitted at a rate of 900 lbs/hr. Dr. Babcock testified that 900 lb/hr is approximately .1% of CO emitted to the affected air quality region. CO accounts for .3% of pollution in the area, therefore Stepan's CO emissions are about .004% of the air pollution in the region on a toxicity basis.

In order for Stepan to come within Rule 201(c), a 96% removal efficiency would be required. The EPA states that the only currently available technology for carbon monoxide control is thermal incineration. This method would consume an additional 5,000,000 gallons of fuel oil or 700,000,000 cubic feet of fuel gas per year. Besides increasing costs of production by 20%, Dr. Babcock states that the incineration process would cause emissions "roughly two to three times as adverse as the original emissions associated with the carbon monoxide alone." (R.87) In addition, Dr. Babcock made an analysis by dispersion modeling of the possible effects of Stepan's discharge on the local area. His conclusion was: "that it was very unlikely that Stepan's emission could cause the ambient air quality standards to be exceeded." (R85)

ArRo Laboratories monitored the ambient air to determine whether Stepan's CO emissions significantly contributed to lowering the ambient air quality from July 31, 1974 to September 3, 1974. Four monitoring stations were erected, monitoring the air quality 24 hours a day. The locations were as follows: south, 1400 feet @ 191°; west, 850 feet @ 239°; north, 1100 feet @ 354°; and east, 1800 feet @ 100°. The carbon monoxide content of the ambient air without Stepan's emissions was 2 ppm. The monitoring showed that, for the majority of the period involved, the ambient carbon monoxide was 2 ppm, including Stepan's emissions. During this period the Rule 310, 8 hour standard, was violated once. ArRo states that this violation was due to automobile exhaust rather than Stepan's emissions. It is evident that Stepan's carbon monoxide emissions do not have a significant impact upon ambient air quality for the region. This conclusion is substantiated by both Dr. Mittlehauser's and Dr. Babcock's testimony at the hearing.

Stepan is investigating the development of a cold catalytic system by which it intends to bring the emissions into compliance with air pollution regulations. Stepan's program schedule is given below. This schedule is based on technical and economic information known to Stepan to date which leads Stepan reasonably to expect that a commercially feasible cold catalytic oxidation system can be developed and constructed at its Millsdale phthalic anhydride plant by January 31, 1978.

1. October 31, 1975 Complete Northwestern University bench study.
2. December 31, 1975 Complete pilot plant design.
3. March 31, 1976 Complete construction of pilot plant at Millsdale phthalic anhydride plant.
4. October 31, 1976 Complete pilot plant study.
5. January 31, 1977 Complete commercial system design; apply for construction permit.
6. January 31, 1978 Complete construction of commercial system at Millsdale phthalic anhydride plant; begin operation.

7. Up until October 31, 1976, should the Illinois Environmental Protection Agency inform Stepan that a commercially feasible control system for carbon monoxide from a partial oxidation production plant similar to Stepan's Millsdale plant is available, and assuming that full information with respect to such carbon monoxide control technology is then made available to Stepan, Stepan will forthwith familiarize itself with that technology and shall within a reasonable time apply for a construction permit for its Millsdale phthalic anhydride plant if, in the opinion of Stepan and the Illinois EPA, such other system is of comparable or greater feasibility than the particular technology to which Stepan is as that time committed.

Pursuant to this schedule, Stepan should comply with Rule 206(c) on or before January 31, 1978. Stepan is sponsoring a graduate student and two faculty members from Northwestern University to perform a research project on the technical feasibility of controlling, by low temperature catalytic oxidation, carbon monoxide emissions from waste gas streams generated within Stepan's phthalic anhydride facility.

In addition to sponsoring the research project above, Stepan has entered into an agreement with Larox Research Corporation, by which Larox will make its investigations of cold catalytic systems available to Stepan.

In the past, the Pollution Control Board has granted variances where there was no existing technology and the petitioner had made a good faith showing that it was conducting an ongoing research program. Mobil Oil Corporation v. EPA, PCB 73-452, 13 PCB 179 (1974); Koppers Company, Inc. v. EPA PCB 73-365 (1973); Trojan-U.S. Powder Co. v. EPA, PCB 7-32 (1974); Union Oil Company of California, PCB 72-477 (1973). To deny the variance in the instant action would require utilization of existing control technology which not only would be expensive, but would have an adverse impact upon energy demand and the environment. Such a ruling would impose an arbitrary and unreasonable hardship upon Stepan while actually injuring the public and environment. Stepan has adequately met the ambient air quality criteria as set forth in Train v. NRDC, Inc., 43 USLW 4467 (US No. 73-1742 April 16, 1975).

The Board will grant Stepan's variance pursuant to certain conditions recommended by the Agency.

This Opinion constitutes the finding of fact and conclusions of law of the Pollution Control Board.

#### ORDER

It is the order of the Board that Stepan Chemical Company is granted a variance from Rule 206(c) for one year from the entry of this Order, subject to the following conditions:

a) Petitioner shall adopt the following schedule for installation of a cold catalytic oxidation system:

1. October 31, 1975      Complete Northwestern University bench study.
2. December 31, 1975    Complete pilot plant design.
3. March 31, 1976      Complete construction of pilot plant at Millsdale phthalic anhydride plant.
4. October 31, 1976     Complete pilot plant study.
5. January 31, 1977     Complete commercial system design; apply for construction permit.
6. January 31, 1978     Complete construction of commercial system at Millsdale phthalic anhydride plant; begin operation.

7. Up until October 31, 1976, should the Illinois Environmental Protection Agency inform Stepan that a commercially feasible control system for carbon monoxide from a partial oxidation production plant similar to Stepan's Millsdale plant is available, and assuming that full information with respect to such carbon monoxide control technology is then made available to Stepan, Stepan will forthwith familiarize itself with that technology and shall within a reasonable time apply for a construction permit for its Millsdale phthalic anhydride plant if, in the opinion of Stepan and the Illinois EPA, such other system is of comparable or greater feasibility than the particular technology to which Stepan is as that time committed.

b) Commencing twenty-eight (28) days after the date of the Board Order and continuing on or before the tenth of each month thereafter, Petitioner shall submit written reports to the Agency detailing all progress made toward compliance during the reporting period. The reports shall be sent to:

ENVIRONMENTAL PROTECTION AGENCY  
Control Program Coordinator  
2200 Churchill Road  
Springfield, Illinois 62706


c) Petitioner shall apply to the Agency for all necessary construction permits.

d) Within twenty-eight (28) days of the Pollution Control Board's Order herein, Petitioner shall post a performance bond in a form satisfactory to the Agency and in the amount of \$25,000 to insure compliance with the research program. Said bond shall be sent to:

ENVIRONMENTAL PROTECTION AGENCY  
Control Program Coordinator  
2200 Churchill Road  
Springfield, Illinois 62706

IT IS SO ORDERED.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 22<sup>nd</sup> day of May, 1975 by a vote of 5-0.

  
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Christan L. Moffett, Clerk  
Illinois Pollution Control Board