ILLINOIS POLLUTION CONTROL BOARD
November 8, 1973

UNION CARBIDE CORPORATION, Petitioner,	)	
v.	)	PCB 73-313
ENVIRONMENTAL PROTECTION AGENCY, Respondent.	)	

J. A. Lipe, Attorney for Petitioner
Thomas A. Cengel, Assistant Attorney General for the EPA

INTERIM OPINION AND ORDER OF THE BOARD (by Mr. Henss)

Petitioner Union Carbide Corporation requests 30 day continuance in order to allow the parties to submit additional argument or information. The Motion is allowed. We believe it may assist the parties in their preparation of additional pleadings, factual stipulations or argument if they receive our present understanding of the background and issues of this case. The following is issued for that purpose.

Union Carbide Corporation produces high quality coke from petroleum by-products at its plant located near Robinson, Illinois. Each year the Company uses about 300,000 tons of petroleum raw materials, which are purchased from several refineries. Union Carbide applies heat to its raw materials in a process called calcining, to drive off oxygen, water vapor and volatile materials in the form of gasses. Particulate matter is also emitted in the process. Most of the petroleum coke produced at this plant is used within the Union Carbide Corporation for the production of carbon and graphite electrodes, carbon arc lighting devices, dry cell batteries, brushes for electric motors and generators, foundry castings and nose cones for rocket missiles. The plant operates 24 hours per day throughout the year, except for an occasional shutdown for repairs, and employs 37 persons. It was constructed in 1958 but was not purchased by Union Carbide until April 1971.

There are two inclined rotary kilns, each measuring 10' in diameter by 180' in length. A natural gas fired burner at the lower end supplies heat of 1450° F. The petroleum raw material is fed into the elevated end of the kiln, and the revolving motion of the inclined kiln causes the raw material to flow by gravity to the lower end as the heat drives off volatile hydrocarbons and water. Gasses and entrained particulate matter from the kiln enter a combustion chamber where excess air is introduced to burn any combustible material prior to exhausting through a 145' stack.

The hot calcined petroleum coke is gravity fed from the burner end of the kiln into an enclosed rotating water spray cooler which reduces the temperature of the coke to about 350° F. Exhaust gasses and entrained particulate matter from the inlet section of each cooler pass through a cyclone prior to exhausting through a 40' stack. Exhaust gasses and entrained particulate matter from the outlet section of each cooler exhaust through a 115' stack which serves both coke coolers. The finished product is carried by bucket elevator to a storage bin from which it is loaded into railroad cars.

Each of the identical kilns can process about 18 tons per hour under normal operating conditions. Petitioner can produce different grades of coke by varying the quantity of air introduced, the heat and retention time. Rarely do the two kilns produce the same product at the same time.

Union Carbide Corporation filed its petition for variance on July 31, 1973 asking for relief from Rules 103(b)(2), 103(b)(6)(E), 104, and 203(b) of the Illinois Air Pollution Control Regulations. These Rules relate to operating permits, compliance programs and particulate emission standards for existing emission sources. Specifically, Petitioner sought a fifteen month variance to operate kiln #1 and a 24 month variance to operate kiln #2 pending installation of air pollution control devices. Subsequently, Union Carbide amended the petition and now seeks permanent variance from Rule 203(b) on condition that Petitioner "discharge not in excess of 24 lbs. per hour of particulate matter from each of its new stacks". A public hearing on the Amended Petition was held on October 3, 1973.

The Agency has recommended that the variance be denied. The Agency states that Petitioner is in violation of the currently applicable particulate regulation, Rule 3-3.111 of the Rules and Regulations Governing the Control of Air Pollution. The Agency further states that since Union Carbide was in violation on the date the Air Regulations went into effect in April 1972 Petitioner will be required to meet the more stringent "new source" standard of Rule 203(a) by December 31, 1973.

Petitioner has not requested a variance from either the current standard, Rule 3-3.111, or the standard it must meet on December 31, 1973, Rule 203(a).

The parties are in basic disagreement in their interpretation of the Regulation and do not agree as to the Standard which must be met. The Agency contends "that the process weight rates from the two kilns must be aggregated for purposes of determining the allowable under Rule 203(a)". Rule 203(a) states "No person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any new process emission source

which, either alone or in combination with the emission of particulate matter from all other similar new process emission sources at a plant or premises, exceed the allowable emission rate specified...." (emphasis supplied) If the two kilns are "similar sources" the Standard to be met is 17.2 lbs./hr. If, as Petitioner contends, the two kilns are not similar sources each kiln will be allowed emissions of 11.86 lbs./hr. for a total of 23.72 lbs./hr. from the plant.

The evidence revealed that two months after Union Carbide purchased the plant, the EPA sent the Company an emission inventory questionnaire with instructions to complete the questionnaire and hold it until someone from the EPA visited the facility. Union Carbide calculated emissions from each of its two kiln stacks at 313 lbs./hr. and stated that emissions were 626 lbs./hr. The record is not clear whether emissions from three other stacks located at the inlet and outlet of coke coolers, were included in the calculation. The information was presented to an Agency investigator in December 1971, and in January 1972 the EPA warned Petitioner of possible prosecution for excessive particulate emissions. The EPA letter stated that Union Carbide was limited to particulate emissions of 28.29 lbs./hr. from each kiln pursuant to Rule 3-3.111 of the Rules and Regulations Governing the Control of Air Pollution.

Petitioner had already engaged the services of Automated Process Surveys of New York to make a study and recommendation as to the design of a control system for the kiln emissions. This was done about six months after Petitioner took possession of the plant, and stack tests had been performed during January 1972, prior to Petitioner's receipt of the warning letter from the EPA. The stack tests revealed that emissions from #1 stack were 260 lbs./hr. and emissions from #2 stack were 100 lbs./hr. It was not specifically stated whether the three stacks which were attached to the spray coolers were tested in January 1972 but we infer from the entire record that they were not.

In June 1972, Automated presented its report. It was recommended that two large fans be installed to blow air into the combustion chambers on the theory that additional air would supply more oxygen for combustion and increased turbulence would help complete the combustion of carbon particles to carbon dioxide and water. Union Carbide installed the fans at a cost of $15,000 on one of the two combustion chambers. This installation was completed in December 1972. Petitioner attempted to perform a stack test on the newly equipped kiln in January 1973 but was prevented from doing so by extremely cold weather. The company claims that there was "visual improvement" in the stack discharge, but the stack test was not taken until March 1973.

Stack tests taken in March 1973 revealed that the stack serving the fan equipped combustion chamber was still emitting 142 lbs./hr. In addition, the stack venting the inlet to the coke cooler was emitting 15 lbs./hr. and the common stack which was venting the outlet from both coke coolers was emitting 60 lbs./hr. These tests convinced Union Carbide that, despite the conclusions and recommendations of Automated Process Surveys, the addition of fans alone would not provide the degree of control necessary to achieve compliance with the Regulations. During this period Petitioner also received a report from Chemstress Consulting Company which had been hired to investigate "every possible method for abatement controls of our Robinson stack except the incinerating settling chamber" (R. 33). The evidence indicates that Chemstress evaluated six possible methods, found that only two methods would bring compliance with the Regulations but would recommend neither of them (R. 34). The record failed to describe any of the methods evaluated by Chemstress and the report was not submitted in evidence. Chemstress recommended the incinerating settling chamber as the control method which should be adopted (R. 34).

In June 1972 Petitioner had employed Air Resources Inc. to evaluate and propose an incinerating settling chamber which would bring the stacks into compliance (R. 33).

Air Resources also evaluated five other systems which were rejected for various reasons. We will not dwell upon those but list them as:

Granular bed filter - not proven commercially

Dry mechanical collector - would reduce particulates to 53 lbs./hr., an insufficient reduction.

Fabric filter - would require over 1400 gallons per minute of water to lower the temperature of the gas to 350°, the maximum operating temperature of the baghouse, and would require 8.5 million killowat hours of electricity (KWH). Capital costs would be $1.7 million and annual operating costs $370,000. This method would also involve other environmental problems since 33 tons per day of fluffy material would have to be disposed of in a landfill and the generation of 8.5 million KWH of power would require the nearby power plant to burn 4700 tons per year of high sulfur Illinois coal.

Electrostatic Precipitator - high efficiency could not be guaranteed due to the nature of the particulate matter. An extensive cooling system would be necessary to reach the 700° operating temperature of the electrostatic precipitator. This system

would consume about 4.3 million KWH per year and would produce 33 tons per day of dry particulate matter with attendant landfill costs.

Wet scrubber - would require 12.8 million KWH of energy, capital costs of $1.9 million and operating costs of $420,000 per year. Water consumption of approximately 500 gallons per minute for each kiln could create a water pollution problem. Disposal of 66 tons per day of wet filter cake would require 14 acres of land over a 5 year period, winter operations might be difficult due to freezing problems and a possible visibility hazard from steam plume. This method would require the burning of 7000 ton of coal per year at the nearby power plant.

Air Resources recommended the combination settling chamber--combustion chamber method as the "most applicable abatement device" for the following reasons:

1) The capital cost of approximately $1,500,000 was the lowest of the six control systems.

2) The operating costs were by far the lowest of all the alternatives which were considered.

3) The system was reliable and proven in similar applications and is the only system in present commercial use in the United States in this application.

4) There would be no attendant solid waste disposal, water pollution, or other environmental disadvantages.

5) It required no power consumption.

Preliminary designs for the combustion chamber called for the construction of chambers approximately 70' long, 27' wide and 27' high on each kiln system. Each chamber would be lined with refractory brick and exhaust through new 10' diameter stacks 145' in height. At page V-1 of the Air Resources report was found the rationale for the Air Resources design: "The basis on which this preliminary design was completed is contained in Table IV. Also, the Union Carbide personnel stressed that the down time required for installation be minimal. This restriction eliminated the most economical installation in which a common stack would serve both kilns". (emphasis supplied)

Originally, the schedule included 15 months installation time for the first chamber with the second chamber to be completed 9 months after the first. After consultation between Petitioner and Air Resources, it was decided that both chambers could be constructed simultaneously thereby reducing the total schedule to about 16 months (R. 42). A maximum of seven (7) days down time for system tie-in was allowed for each chamber.

Gary Nagl, Project Manager for Air Resources, testified that the proposed chambers would allow for the complete combustion of all combustible material to carbon dioxide and water (R. 74). The control system could reduce Petitioner's particulate emissions to 11.86 lbs./hr. from each kiln stack (R. 76). The particulate matter emitted would consist solely of ash type material, 60% of which would be ash residue from the raw petroleum material and the remainder silica, alumina, ferric oxide and calcium oxide from the eroded kiln refractory lining. Although Nagl initially said that to the best of his knowledge the particulate emissions were not toxic in nature, he finally stated that he was not qualified to testify about the toxicity of the materials (R. 95).

At the time the Regulations were adopted on April 14, 1972 the Union Carbide plant was obviously not in compliance with Rule 203(b) and was not under a variance. Therefore, Rule 203(c) is applicable. That Rule provides that Petitioner must be in compliance with the more stringent provisions of Rule 203(a) (new emission sources) by December 31, 1973. The current particulate Regulation is Rule 3-3.111 of the Rules and Regulations Governing the Control of Air Pollution. Neither the original nor the amended variance petition addressed that fact. Petitioner has not requested a variance from Rule 3-3.111 or Rule 203(a) but specifically asks for a permanent variance from Rule 203(b), a Rule which is inapplicable to Petitioner's operation. It seems therefore, that the Petition should be dismissed without prejudice.

We assume that Union Carbide might file a new Petition for Variance or an amendment in this action and will therefore indicate some guidelines which might be useful in future proceedings. Permanent variances have not been granted and we do not foresee the time when they will be. Legislative intent, we believe, is found in Section 5(b) of the Environmental Protection Act:

> "It is the purpose of this Act...to restore, protect, and enhance the quality of the environment and to assure that adverse effects upon the environment are fully considered by and borne by those who cause them."

We do not find any legislative intent that excessive emissions of contaminants should continue indefinitely. The legislative purpose to "restore" environmental quality leaves no room for permanent variances. Variances are granted where compliance with the Statute or applicable regulations would impose an arbitrary or unreasonable hardship and even then the polluter must have a reasonable plan to bring the facility into compliance. The granting of a variance is not taken lightly by this Board. In Mt. Carmel Public Utilities Company vs. EPA, PCB 71-15 we stated:

> "Except for cases of 'no technology available' this Board must require that those who seek a 'shield against enforcement cases' (which is what a variance is) must have a definite program to control the emissions with existing control technology". (See also: Harold L. Swords vs. EPA, PCB 70-6, Central Illinois Public Services vs. EPA, PCB 71-261, 71-262, 71-263 and 71-264, Hardwick Bros. Co. vs. EPA, PCB 71-17, Flintkote Co. vs. EPA, PCB 71-68, Chambers, Bering, Quinlan Co. vs. EPA, PCB 71-102, Metropolitan Sanitary District (Village of Streamwood) vs. EPA, PCB 71-183, York Center Community Cooperative vs. EPA, PCB 72-7, and Laesch Dairy Company vs. EPA, PCB 72-93.)

Without reservation we reaffirm the criteria for grant of a variance. Where control technology is available and its use will not impose an unreasonable hardship upon the Petitioner, a variance can only be granted upon a showing of eventual compliance with the Standard.

In this case the parties disagree as to the standard to be met. The Amended Petition states: "that prior to this time Petitioner's engineers had been under the impression that the Agency would treat each of the two new stacks as a separate source for process weight rate calculation purposes" (Amended Petition for Variance, p. 2). However, Mr. Nagl testified as follows:

> Mr. Cengel: When you started this program were you asked to come up with a program which met a specific level in terms of emissions?
>
> Mr. Nagl: We were asked to come up with a program which will put the plant in compliance with the Regulations.
>
> Mr. Cengel: You were not asked for a specific figure?
>
> Mr. Nagl: During the course of it we decided it was going to be a single source requiring 11.86 lbs./hr.

Mr. Cengel: Who was we you are speaking of?

Mr. Nagl: Union Carbide and Air Resources.(R. 97)

Petitioner fails to identify the Agency employee who allegedly interpreted the two kilns as two separate emission sources The record simply does not support Petitioner's allegations that the EPA had committed itself to that interpretation.

If each kiln is considered a separate emission source, then Union Carbide will have to meet a limitation of 11.86 lbs./hr. for each of the two kilns or a plant total of 23.72 lbs./hr. [Rule 203(a)]. The settling chamber-combustion chamber which is proposed by Union Carbide would apparently meet this limitation. On the other hand, if Petitioner's two kilns are adjudged "similar" under Rule 203(a), Petitioner will be required to meet a total emission rate of 17.2 lbs./hr. Union Carbide claims that the proposed control system can not meet such requirements.

In our opinion adopting the Air Pollution Control Regulations we said:

> "similar sources are to be aggregated for purposes of determining the applicable process weight. The significance of this provision is that more effective controls are required on larger units, both because of their greater potential for harm and because of well recognized deficiencies of scale in control equipment. This graduated control requirement was a feature of the original Bay Area Table. It is important, therefore, to treat multiple units of the same kind on the same premises as if they were one, both to prevent circumvention by building several small units instead of one large one and because of the practicality of applying a single large control device to a number of small like sources. Because these latter policies do not apply to sources of different kind, it is not necessary to aggregate a basic oxygen furnace with an asphalt saturator, or even with a sintering plant, for purposes of this Rule."

We chose not to include a definition of "similar emission sources" in Rule 201 of the Regulations because the physical complexity of many facilities would require the careful sifting of all pertinent information before two or more sources could be adjudged similar. A rigid definition simply could not encompass all of the various factors that might arise from the multiplicity of Illinois emission sources. Thus, we determined that a case by case determination would be required.

Since neither the current Regulations nor the prior Rules were in force at the time of construction, the Union Carbide plant was

obviously not built with circumvention in mind. The question of circumvention might arise in future proceedings since the Air Resources report at page V-1 clearly states that Union Carbide placed such restrictions on Air Resources that the consulting firm had to eliminate "the most economical installation in which a common stack would serve both kilns". These restrictions, we are told, were necessary to limit down time and were therefore a matter of economics and not an attempt to circumvent the Regulations. But the current plan for concurrent construction of control systems might now remove this objection to the single stack concept. We have previously said that one reason for the rule is the "practicality of applying a single large control device to a number of small like sources". However, we do not have sufficient information in this case to determine if one common control system is practical. We need information regarding:

1. The chemical and physical characteristics of materials entering the process, leaving the process as product and leaving the process as emissions in the operation of the two kiln systems.

2. Frequency of and reasons for producing dissimilar products in the simultaneous operation of the kilns.

3. Proximity of the two kiln systems and economic reasonableness and technical feasibility of the single large combustion--settling chamber in comparison to other plans which have been advanced.

While these guidelines are not to limit the issues, the Board does feel that these are some of the matters which should be more fully developed. In deciding whether the two kilns are similar sources we will consider not only the product and the useage of the kilns, but whether they were constructed or modified to circumvent the Regulations and whether it is practical to treat them as similar for control purposes. The issue of "practicality" involves not only questions of technical and economic feasibility, but an assessment of total impact on the environment. We note that some forms of control create other environmental problems, i.e. water pollution, the burning of coal at power plants. If it appears that the total environment may be damaged by considering the stacks to be "similar sources" then it would seem to be impractical to consider them as similar.

ORDER

Thirty day continuance is allowed for the purpose of allowing the parties to submit additional pleadings, factual stipulation or written argument.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order was adopted this 8th day of November, 1973 by a vote of 5 to 0.

Christan L. Moffett