

ILLINOIS POLLUTION CONTROL BOARD
December 5, 1974

REPUBLIC STEEL COMPANY)
)
)
 v.) PCB 73-551
)
)
 ENVIRONMENTAL PROTECTION AGENCY)

MR. JOHN F. WARD, JR., O'KEEFE, ASHENDEN, O'BRIEND AND HANSON,
appeared on behalf of Petitioner;
MR. PETER ORLINSKY, appeared on behalf of the Environmental
Protection Agency;

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

Petitioner, on December 21, 1973 filed a petition for variance from Rule 203(d)(6)(B)(iv)(aa), Rule 202(b), Rule 203(d)(6)(b)(ii)(bb) and Rule 206(d) of the Air Pollution Regulations. The petition pertains to a by-product coke oven battery, melt shop facilities and blast furnace excess gas presently bled to the atmosphere.

Republic Steel Corporation, a New Jersey Corporation (Petitioner), having principal offices in Cleveland, Ohio, operates an integrated steel mill at 11600 Burley Avenue, on the Calumet River, approximately 3 miles upstream from Lake Michigan and about 14 miles south and east of Chicago's Loop.

The coke plant consists of a single battery of 75 ovens built in 1923 by Wilputte using a patented Wilputte underjet design of heating. Each oven is 18-3/8 inches wide x 13 ft. 2-3/8 inches high and 40 feet 7-5/8 inches long. The ovens have a rated capacity of 18 tons of coal per charge which will produce approximately 13 tons of coke. The design pushing schedule is 110 ovens per day, however, the present operating rate is 100 ovens per day due to the age of the battery. In 1972, 652,209 tons of coal were coked for an average of 1,790 tons per day. The ovens are grouped together, side by side, on approximately 3-1/3 foot

centers. In each wall between adjacent ovens are a row of heating flues, thus, all but the flues at the ends of the battery serve two adjacent ovens. Blast furnace gas and coke oven by-product gas are used to heat the oven walls through the heating flues. The ends of the oven chamber are closed off with removable refractory lined doors. The oven doors are in principle, selfsealing doors with a stainless steel knife edge around the door which is spring-loaded and which depends upon a metal-to-metal contact between the door and the continuous machined surfaced cast iron jamb for sealing. The sealing edge of the door is carried on a flexible frame, and the door assembly is so designed that a powerful spring between the locking bar and the door forces the sealing edge against the metal door jamb with considerable pressure. After the oven is charged with coal, the volatile products liberated in the coking process are carried off through a gas collecting system at the top of the oven. The volatile products contain tar, and part of these products escape into the atmosphere past the sealing edge of the door. As the tar strikes the colder surfaces in the area of the sealing edge, it hardens to complete the sealing of the door.

At the conclusion of the coking cycle, the coke is pushed out of the oven, through a guide, and into a quench car. The hot coke is transported in the quench car to the quenching station where generous quantities of water are used to quench the coke. At the time of pushing, the coke is 90-91 percent carbon and of a temperature of approximately 2,000 Fahrenheit. When the hot coke (carbon) is pushed from the oven where it has been coked in the absence of air, the coke starts to oxidize in the presence of air and emissions enter the atmosphere until the coke is quenched with water to prevent it from burning to an ash.

Petitioner has achieved compliance in the operation of the plant as far as charging and quenching is concerned. However, he has not achieved compliance as far as oven door leakage and pushing emissions are concerned. Petitioner has committed himself to building a coke side shed, with whatever particulate removal equipment may be required. However, it will be impossible to achieve compliance with pushing emission standards immediately, and therefore he requests a variance from Rule 203(d) (6) (B) (ii) (bb) which requires control of pushing emissions by December 31, 1974. Petitioner is under orders by the Federal Environmental Protection Agency to achieve compliance with Rule 203(d) (6) (B) (ii) (bb) by August 1, 1976, to which Petitioner has consented. We are therefore granting a variance for one year from the date of this Order. Petitioner will have to request additional variances until compliance is achieved in 1976.

The Board is aware that in granting this variance beyond May 30, 1975 it raises legal questions as to whether immunity from Federal enforcement action is granted. Counsel for Petitioner has represented that an agreed-upon court order with the Federal government is pending and will be entered.

Petitioner has made considerable progress in suppressing door emissions but has not achieved compliance. On the basis that he has agreed to a cooperative study with the Agency and has also agreed to withdraw his judicial appeal from the Board's rules, we are granting a variance from Rule 203(d)(6)(B)(iv)(aa) to December 31, 1974.

The Petitioner's melt shop facilities consist of four open-hearth furnaces and three electric arc furnaces.

Each of the open-hearth furnaces in this shop are similar but not identical in physical makeup, and have been upgraded during the past years to make them more efficient and permit the use of natural gas roof burners and/or oxygen roof lances.

Electrostatic precipitators for controlling particulate emissions have been retro-fitted to Petitioner's furnaces between the waste heat boiler and the stack. The four open hearth furnaces in this shop are rated at 250 tons per heat, and actually averaged 260.5 ingot tons per heat during the year 1973. There are four furnaces in the shop and the average number of furnaces operated for 1973 was 3.0 furnaces with one furnace being down for normal maintenance and rebuilding of the refractories which deteriorate from the high furnace temperatures which are in excess of 3000°F. The process weight for the year 1973 averaged 112,800 lbs. per hour based on a charge to tap time of 5.6 hours.

The furnace is charged through the five doors in the front wall of the furnace. The ratio of cold to hot metal charged is approximately one to three. The charging time averages about 15 minutes.

Fuels used for melt down are Bunker "C" oil and coke oven gas. Oxygen is used for metal working at the rate of 3,500 cfm. The oxygen lances are lowered through the roof of the furnace.

The furnace is tapped on the opposite side of the hearth from the charging doors and the metal flows through a long spout into a ladle. Pouring time averages about 10 minutes.

All of the furnaces are connected to a common flue and the products of combustion and particulates are passed through either a waste heat boiler or cooling chamber to reduce the temperature of the gases below 500°F prior to entry into the electrostatic precipitators (ESP).

The first ESP system was installed on two of the open hearth furnaces in 1962 at a cost of approximately 4 million dollars.

On April 23, 1971, six additional cells or units were placed in operation, which more than tripled the capacity of the original installation. The cost of the additional ESP units was approximately 7 million dollars and has sufficient capacity to handle the gases from the 3 operating furnaces. The original installations made in 1962 are standby and used as maintenance cells whenever work is required on the new units.

The efficiency of the ESP units in controlling the collected particulates is reported to be in excess of 99 percent. Considerable emissions from the charging and tapping operations as well as residual emissions during meltdowns and oxygen lancing from the furnace doors are not collected by the control system, however, and are discharged to the atmosphere through the building monitor.

Three electric arc furnaces rated at 150 tons each are housed in the open-hearth building; in 1973 the shop averaged 2.8 furnaces. The charge-to-tap time of these furnaces is approximately 5 hours/heat. In 1973, the process weight rate for the furnaces was in the range of 92,000 - 93,000 lbs./hr.

Cold scrap is charged from a bottom drop bucket held by an overhead traveling crane which requires the roof of the furnace to be swung and disconnected from the central duct. Hot steel is tapped into a ladle by tilting the furnace. This process is also uncontrolled. In addition, some particulate emissions from the electrode ports during melt down and from the slagging spout during slag-off are not collected and are discharged to the atmosphere through the building monitor. Republic has committed itself to the control of these residual emissions are described in paragraph 13 of the Variance Petition.

Petitioner's open hearth furnaces and electric furnaces are in compliance so far as furnace discharges are concerned, the particulates from the open hearth furnaces being removed

in an electrostatic precipitator, and the particulates from the electric arc furnaces in a bag filter installation. However, during certain parts of the heat cycle there are substantial emissions which are not captured by the control equipment and leave the building without any control. For the open hearth furnaces these operations are charging, tapping, melt down and oxygen lancing phases of the heat cycle. In the case of the electric arc furnaces there were heavy emissions during the scrap charges, at the start of meltdown through the electrode parts, during slag-off and during the tapping operation.

Petitioner has been studying the problem of residual emissions from the melt shop for 18 months and has agreed to announce the solution by June 28, 1974. However, a variance will be necessary to allow time to make whatever installations are necessary.

The excess blast furnace gas, which is vented to atmosphere violates the CO standards because it contains over 200 parts per million of CO. Petitioner is installing a 250,000 lb./hr. steam generator which will use the excess blast furnace gas and thus come into compliance. The steam generator is well on its way to completion and is scheduled to become available by December 31, 1974. We are therefore granting a variance from Rule 206(d) to that date.

Petitioner and the Agency have come to an agreement of the issues in this case and to a course of action which will greatly benefit the cause of cleaner air and we are basing our Order on this agreement.

It is the Order of the Board that:

1. Petitioner be granted variances from the following rules for the periods stated:

a) Rule 203(d)(6)(B)(iv)(aa) for its coke oven doors from January 1, 1974 to December 31, 1974.

b) Rule 203(d)(6)(B)(ii)(bb) for its pushing and quenching operations for one year from the date of this order.

c) Rules 202(b) and 203(b) for its open hearth and electric furnaces from January 1, 1974 to December 31, 1974.

(d) Rule 206(d) for its blast furnace gas emission from January 1, 1974 to December 31, 1974.

2. That said variance be subject to the following conditions:
- a) Within 30 days of the Board's Order herein, Petitioner shall submit to the Agency for its approval a program for the maintenance of all doors and a regular schedule including work to be done by outside contract.
 - b) Within 30 days of the Board's Order herein, Petitioner and the Agency shall jointly agree on procedures for a study of door leakage and, thereafter, the Petitioner shall share with the Agency engineers all available data as may be required to conduct and complete such a study.
 - c) Petitioner shall be required to maintain at all times an adequate inventory of doors, frames, jambs, and seals so that any defective equipment can be expeditiously replaced.
 - d) Petitioner shall continue to experiment with the use of coke oven doors with vented refractory linings on the coke side in order to reduce door leakage. Progress reports including the number of such doors in use and the effectiveness of the doors shall be included as part of the quarterly reports required in condition j) below.
 - e) Petitioner shall continue to operate and maintain the integrity of controls with respect to oven charging, topside off-gas collection system, battery, underfiring, and coke oven doors in order that air pollution from these sources does not increase over present levels.
 - f) Within 10 days of the Board's Order herein, Petitioner shall submit to the Agency an acceptable method for controlling smoke and particulate emissions from coke pushing, quench car travel and quench tower.
 - g) Within 30 days of the Board's Order herein, Petitioner shall apply to the Agency for a construction permit for the installation of hoods over the electric arc furnaces.
 - h) On or before July 1, 1974, Petitioner shall submit to the Agency an acceptable plan for controlling residual emissions from its open-hearth furnaces.
 - i) within 30 days of any changes in operating procedures, Petitioner shall submit revisions to its Work Rules which are on file with the Agency.
 - j) Petitioner shall submit to the Agency a report of its progress made in implementing the program covered by the Order of the Board herein at the end of each calendar quarter.

k) All required reports shall be sent to:

Environmental Protection Agency
Division of Air Pollution Control
2200 Churchill Road
Springfield, Illinois 62706
Attn: Control Program Coordinator


l) That with respect to its Variance from Rule 203(d) (6)(B)(ii)(bb) for its pushing operation, the Petitioner shall be required to comply with Order No. EPA-5-74-a of the United States Environmental Protection Agency, a copy of which is attached to this Joint Recommendation as Exhibit A and which is hereby incorporated and made a part of the Joint Recommendation.

m) Within 60 days of the Board's granting of the Variance requested by Petitioner, the Petitioner shall dismiss its appeal of various of the PCB rules now pending before the Illinois Appellate Court as number 57478.

3. Within 10 days of this Order, Petitioner will post a bond with the Environmental Protection Agency signed by the appropriate officers in the amount of \$100,000 to cover the cost of purchasing, construction, and installation of the new equipment.

Mr. Henss dissents.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 5th day of December, 1974 by a vote of 4-1.



Christan L. Moffett, Clerk
Illinois Pollution Control Board